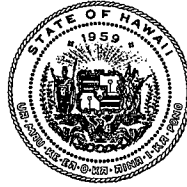


SB 1008



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

COMMITTEE ON HEALTH
COMMITTEE ON ENERGY & ENVIRONMENT

SB1008, Relating to Water Quality Standards

**Testimony of Chiyome Leinaala Fukino, M.D.
Director of Health**

February 23, 2009

2:45 p.m.

1 **Department's Position:** The Department supports this bill with amendments.

2 **Fiscal Implications:** None for the Department.

3 **Purpose and Justification:** This bill revises by statute the water quality standards for bacteria in
4 marine waters and the water quality standards for chlordane and dieldrin.

5 The Department agrees with the concept of changing the state water quality standards for most
6 toxic pollutants by tying them to the national criteria currently recommended by the U.S. Environmental
7 Protection Agency (EPA). We recommend a broader approach that covers more than chlordane and
8 dieldrin, as the current bill does. We do suggest some changes and exclusions, explained below. The
9 Department also agrees with amending state water quality standards for bacteria indicators for
10 recreational water to be consistent with latest EPA standards, with changes to the identification of
11 recreational waters, also explained below.

12 The Department has been working on amendments to its water quality standards rules, Hawaii
13 Administrative Rules (HAR) chapter 11-54, but the current first set of amendments is narrower than this

1 bill, and a second set of amendments to cover chlordane and dieldrin will take somewhat longer. Our
2 current first set will take care of a typographical error in the chlordane standard and to conform to
3 federal standards for the water bacterial indicator within 300 meters of shore. We had hoped to
4 complete this set by May, but the Small Business Regulatory Review Board lacked a quorum for its
5 February 18, 2009, meeting and did not review our proposal, and we now target completion in June. In
6 October 2008, we did announce our intention to update the state criteria for all the toxic pollutants to
7 meet 2006 EPA criteria, which might take several months. We have now targeted a smaller second set
8 of rule amendments to update chlordane and dieldrin to meet the 2006 EPA criteria, and this will take a
9 few months more than the first set.

10 The Department suggests amending Sections 1-4, and 6 of this bill and attaches proposed
11 language that incorporates these changes as recently adopted in the companion bill, HB834 HD1.

12 In Section 1, we clarify that the current federal toxic pollutant standards for fish consumption
13 also cover inland waters, as do the current department standards for toxic pollutants. Section 1 of the
14 current bill refers to marine waters, but Section 2 changes standards that to cover all waters. We also
15 clarify that numerical criteria should support both designated and existing uses to more clearly adhere to
16 federal requirements.

17 In Section 2, we propose to change the State water quality standards for most toxic pollutants by
18 tying them to the 2006 national criteria currently recommended by the U.S. Environmental Protection
19 Agency (EPA). These federally-recommended toxic pollutant criteria provide substantial and sufficient
20 public health protection for fish consumption, and are developed with nationwide resources and
21 expertise that cannot be matched at the state level. For this reason, we suggest that the bill also include
22 federally-recommended water quality criteria for the protection of aquatic life (acute and chronic effects
23 in fresh water and salt water). If there are public concerns about the criteria that would be adopted for
24 specific pollutants, we encourage them to be brought forward as soon as possible during this legislative

1 process. For example, the City suggests that the amended water quality standards not include EPA
2 criteria for non-priority toxic pollutants for which there is currently no corresponding state criterion
3 (“new” federal criteria for non-priority toxics). Although we presently have no scientific or policy
4 reasons for supporting this suggestion, we are open to further discussion.

5 We recommend that the amended water quality standards not include:

- 6 1) EPA criteria for specified metals, because Hawaii specific research supported the current
7 standards, and we need time to evaluate whether changes are appropriate; and
- 8 2) Pollutants for which current water quality standards apply but for which there is no
9 corresponding federal criterion, so the lack of federal criterion does not impliedly repeal our
10 current standard.

11 The Department supports Section 3 of this bill, which proposes essentially the same changes as
12 our stalled 2005 administrative revision package. It includes a new 33 meter depth limit designation for
13 coastal recreational waters, creates a class of infrequent use recreational waters and sets its shore most
14 boundary 500 meters from shore, and changes bacterial indicator criteria to match federal regulatory
15 levels. Through our work with an Indicator Bacteria Working Group in 2004-2005, we understand that
16 most recreational diving activity occurs within thirty-three meters of the surface, and that most
17 recreational surfing and swimming takes place within five hundred meters of shore. Given the low
18 degree of scientific confidence in the validity of federal indicator bacteria criteria in general, State of
19 Hawaii participation in nationwide efforts to improve these criteria, and the structure of State and EPA
20 standards for adjacent waters, it is in the best interests of the State, EPA, and the scientific community
21 for Hawaii to maintain consistency with the current national criteria, until new indicators or approaches
22 can be promulgated by EPA. Raising the standard to 35 CFU per 100 ml will allow the DOH lab to use
23 faster analytical methods that are not suitable for our current standard of 7 CFU per 100 ml. Because
24 most if not all coastal states use 35 CFU per 100 ml as their coastal waters standard, new analytical

1 methods are under development for counts in the range of 35 CFU per 100 ml, and not for lower counts.
2 Upstream from the marine waters where our current standard of 7 CFU per100 ml applies, the inland
3 water standard, per EPA recommendation, is 33 CFU per100 ml. Makai from where our current
4 standard of 7 CFU per100 ml applies, the EPA standard of 35 CFU per100 ml applies. This creates a
5 confusing and illogical standards situation that is difficult if not impossible to implement responsibly.

6 In the nineteen years since the current state criteria were adopted, the Department has not seen
7 any reliable scientific evidence to suggest that public health will be compromised by these proposed
8 changes. As is currently our practice in implementing the 7 CFU per 100 ml standard, chronic
9 exceedances of the 35 CFU per 100 ml standard will be addressed through our Decision Rule, and
10 advisories will be issued if when we determine that the source of enterococcus is likely to be human, or
11 otherwise threatening to public health.

12 In Section 3 we also add a subsection on monitoring to reduce potential confusion and conflict
13 with existing Hawaii Administrative Rules, chapter11-54, and facilitate the Department's
14 implementation of the proposed changes.

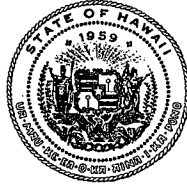
15 For Section 4 we add language clarifying that the state review and adoption of a change in
16 standards for one pollutant, with EPA approval, does not repeal standards for all other pollutants
17 covered by the bill.

18 For Section 6 we add the language of the companion bill, HB834 HD1.

19 Under federal law, EPA must approve state water quality standards before they can be
20 implemented by states and EPA to meet federal requirements. EPA requirements appear at 40 C.F.R.
21 Parts130 and 131. The Department will work with EPA following the passage of this bill to achieve an
22 approval agreement.

23 Thank you for the opportunity to testify.

LINDA LINGLE
GOVERNOR OF HAWAII



CHIYOME LEINAALA FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

SB1008, Relating to Water Quality Standards
DOH Proposed Language for a SD 1
Attachment to Testimony

1 SECTION 1. The purpose of this Act is to revise certain state
2 water quality standards for inland and marine waters on an interim
3 basis to conform to levels recommended by the State of Hawaii and the
4 United States Environmental Protection Agency, until the state
5 department of health proposes, and the United States Environmental
6 Protection Agency approves, standards for the pollutants and
7 indicator organism identified in this Act, pursuant to the review of
8 state water quality standards mandated under section 303(c) of the
9 Federal Water Pollution Control Act of 1972, as amended. The
10 legislature finds that these revisions are important to the economic
11 or social development of the State, and that these revised standards
12 are adequate to fully protect the designated and existing uses of the
13 State's inland and marine waters.

14 SECTION 2. (a) In accordance with Sections 303(c) and 304(a) of
15 the [Clean Water] Federal Water Pollution Control Act of 1972, as

1 amended, and the United States Environmental Protection Agency
2 National Recommended Water Quality Criteria, the following water
3 quality standards found in the 2006 U.S. Environmental Protection
4 Agency National Recommended Water Quality Criteria for Toxic
5 Pollutants (Office of Water, Office of Science and Technology 4304T),
6 including the applicable footnotes and appendices, are hereby adopted
7 by the State[:] as water quality standards and apply to all state
8 inland and marine waters with exceptions as indicated in subsection
9 (b).

10 (b) For all Priority Pollutants and Non-Priority Pollutants:
11 all recommended water quality criteria for the protection of aquatic
12 life in surface water (acute and chronic effects in fresh water and
13 salt water), and for the protection of human health for consumption
14 (organism only), except those nationally recommended water quality
15 criteria for arsenic, cadmium, chromium III, chromium VI, copper,
16 lead, mercury, nickel, selenium, silver, and zinc.

17 (c) When there is no national recommended criterion promulgated
18 for a Priority or Non-Priority Pollutant, relevant provisions in
19 chapter 11-54, Hawaii Administrative Rules, relating to that
20 pollutant are not repealed or deemed inconsistent with this Act and
21 remain in effect.

22 [(A) Chlordane *et seq.* deleted]

23 [(B) Dieldrin *et seq.* deleted]

24 SECTION 3, *add a subsection (d).*

1 (d) At locations where sampling is less frequent than five
2 samples per twenty-five to thirty days, no single sample shall exceed
3 the single sample maximum nor shall the geometric mean of these
4 samples taken during the thirty-day period exceed thirty-five colony
5 forming units per one hundred milliliters.

6 SECTION 4. Except as provided in section 2(c) of this Act, t[T]o
7 the extent any [the] provision[s] in [of Title 11,] c[C]hapter 11-54,
8 [of the] Hawaii Administrative Rules is [are] inconsistent with this
9 Act, that provision is [they are] superseded. Water quality standards
10 not inconsistent with this Act remain in effect.

11 SECTION 6. This Act takes effect on January 1, 2050 [upon
12 approval]; provided that t[T]he specific water quality standards
13 prescribed [here]in this Act take effect upon their approval by the
14 United States Environmental Protection Agency. Provisions in t[T]his
15 Act relating to any particular pollutant or indicator organism are
16 repealed upon the approval by the United States Environmental
17 Protection Agency of water quality standards for the pollutant[s] and
18 [or] indicator organism[s] identified [here]in this Act, following the
19 State's review and adoption of water quality standards pursuant to
20 section 303(c) of the Federal Water Pollution Control [Clean Water]
21 Act of 1972, as amended.

OFFICE OF THE MAYOR
CITY AND COUNTY OF HONOLULU

530 SOUTH KING STREET, * HONOLULU, HAWAII 96813
PHONE: (808) 768-4141 * FAX: (808) 768-5552 * INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR



February 23, 2009

The Honorable David Y. Ige, Chair
Committee on Health
The Senate
State Capitol
Honolulu, Hawaii 96813

The Honorable Mike Gabbard, Chair
Committee on Energy and Environment
The Senate
State Capitol
Honolulu, Hawaii 96813

Dear Chairs Ige and Gabbard, and Members of the Joint Committee:

Re: Senate Bill 1008
Relating to Water Quality Standards

The City and County of Honolulu strongly supports Senate Bill 1008. This bill updates water quality standards, which are central to two major issues facing the City: (1) a 2004 lawsuit brought against the City by the Sierra Club and other nongovernmental organizations, and (2) decisions by the Environmental Protection Agency denying variances from secondary treatment under Section 301(h) of the Clean Water Act for our City's two largest treatment plants at Sand Island and Honouliuli.

This bill updates three water quality standards, chlordane, dieldrin, and enterococcus, consistent with the recommendations of the EPA and the State Department of Health. It updates the water quality standards for chlordane and dieldrin to conform to current EPA national recommended criteria. It updates the

The Honorable David Y. Ige, Chair
Committee on Health
The Honorable Mike Gabbard, Chair
Committee on Energy & Environment
February 23, 2009
Page 2

water quality standards for enterococcus to adopt those proposed by the Department of Health in 2005, which have not yet been formally adopted.

These are not controversial amendments. The Department of Health has opined that the federally recommended toxic pollutant criteria provide substantial and sufficient public health protection for fish consumption, and are developed with nationwide resources and expertise that cannot be matched at the state level. In fact, the Department of Health has asked that this bill be amended to effect broader updates to the State Water Quality Standards beyond just chlordane, dieldrin, and enterococcus. We have been working with DOH, and offer the attached SD 1 to accommodate their interests.

Your prompt action on this important legislation is needed. The potential economic impact of the Sierra Club litigation and the 301(h) decisions are tremendous, and are growing each day. Sierra Club is pressing the federal Court to impose violations and injunctive relief against the City based on permit limits that are derived from the current outdated water quality standards. To give you an idea of how much the City is facing in potential penalties, the Sierra Club has asked the Court to assess 5,726 violations for exceeding our Sand Island permit limits for chlordane on a daily basis from May 30, 1999 to March 31, 2007. This amounts to more than \$186 million in potential penalties up to the end of March 2007. If the water quality standard for chlordane were updated as reflected in this bill, we would be in full compliance with properly derived chlordane permit limits at Sand Island.

In addition, the EPA's final decisions that we must upgrade our Sand Island and Honouliuli wastewater treatment plants to full secondary treatment are based in large part on the finding that the discharges from our deep ocean outfalls, nearly two miles from shore and more than 200 feet deep, may not meet the existing water quality standards. These decisions will cost City ratepayers more than \$1.2 billion in construction costs alone.

We have vigorously argued to the Court and the EPA that the existing erroneous and outdated water quality standards should not be a basis for inferring any potential negative effects on human health, particularly when decades of testing, monitoring, and analysis shows that our deep ocean discharges are not harmful in any way. However, they have said that the City must be held to the water quality standards that have been promulgated by DOH. It is unfortunate that the EPA and Sierra Club would give such disproportionate weight to these water quality standards while ignoring volumes of real world

The Honorable David Y. Ige, Chair
Committee on Health
The Honorable Mike Gabbard, Chair
Committee on Energy & Environment
February 23, 2009
Page 3


evidence, but they will continue do so as long as the existing water quality standards remain in place.

With financial impacts of this magnitude, in this time of such grave economic uncertainty, we must do everything we can to ensure that the decisions of the EPA and the Court are based not on acquiescence and inaction, but on the best available scientific information and most rigorous analysis. Toward that end, we are asking you to pass this legislation. We propose the attached SD1 to accommodate DOH's expressed desire to more broadly adopt the national recommended criteria as the most appropriate water quality standards for our State.

The Sierra Club litigation is ongoing and our supplemental briefs for our 301(h) appeals are due on March 11, 2009. We ask for your prompt action. We assure you that if SB 1008 is passed, we at the City are prepared to do everything we can to make sure it gets the utmost consideration by the EPA and the Court.

Thank you for the opportunity to testify.

Yours truly,



Mufi Hannemann
Mayor

Attachment

A BILL FOR AN ACT

RELATING TO WATER QUALITY STANDARDS.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The purpose of this Act is to revise certain state water quality standards for inland and marine waters on an interim basis to conform to levels recommended by the State of Hawaii and United States Environmental Protection Agency, until the state Department of Health proposes, and the United States Environmental Protection Agency approves, standards for the pollutants and indicator organism identified in this Act, pursuant to the triennial review of state water quality standards mandated under section 303(c) of the Federal Water Pollution Control Act of 1972, as amended. The legislature finds that these revisions are important to the economic and social development of the State, and that these revised standards are adequate to fully protect the designated and existing uses of the State's inland and marine waters.

SECTION 2. (a) In accordance with Sections 303(c) and 304(a) of the Federal Water Pollution Control Act of 1972, as

amended, and the 2006 United States Environmental Protection Agency National Recommended Water Quality Criteria, the water quality criteria in the current National Recommended Water Quality Criteria (including the applicable footnotes and appendices) for all Priority Toxic Pollutants and Non-Priority Pollutants for the protection of aquatic life in surface water (acute and chronic effects in fresh water and salt water), and for the protection of human health for consumption (organism only), are hereby adopted by the State as water quality standards and shall apply to all state inland and marine waters, except for:

- (1) The National Recommended Water Quality Criteria for arsenic, cadmium, chromium III, chromium VI, copper, lead, mercury, nickel, selenium, silver, and zinc; and
- (2) The National Recommended Water Quality Criteria for non priority pollutants not currently listed in chapter 11-54, Hawaii Administrative Rules.

(b) When there is no nationally recommended criterion promulgated for a Priority or Non-Priority Pollutant, relevant provisions in chapter 11-54, Hawaii Administrative Rules, relating to that pollutant shall not be repealed or deemed inconsistent with this Act and shall remain in effect.

SECTION 3. (a) In accordance with 40 Code of Federal Regulations Section 131.41, the State designates as coastal recreation waters all waters up to three miles from shore to a depth of thirty-three meters, excluding areas where water contact recreational activities are prohibited by State or federal law or regulation.

(b) In coastal recreation waters within five hundred meters from the shoreline, enterococcus content shall not exceed a geometric mean of thirty-five colony forming units per one hundred milliliters in not less than five samples which shall be spaced to cover a period between twenty-five and thirty days. No single sample shall exceed the single sample maximum of one hundred and four colony forming units per one hundred milliliters or the site-specific one-sided seventy-five per cent confidence limit.

(c) Coastal recreation waters between five hundred meters and three miles from shore shall be designated as infrequent use coastal recreation waters, and enterococcus content in these waters shall not exceed a geometric mean of thirty-five colony forming units per one hundred milliliters in not less than five samples which shall be spaced to cover a period between twenty-five and thirty days. No single sample shall exceed the single sample maximum of five hundred and one colony forming units per

one hundred milliliters or the site-specific one-sided ninety-five per cent confidence limit.

(d) At locations where samples are taken less frequently than five samples for each twenty-five to thirty days, no single sample shall exceed the single sample maximum nor shall the geometric mean of these samples taken during the twenty-five to thirty-day period exceed thirty-five colony forming units per one hundred milliliters.

SECTION 4. Except as provided in section 2(b) of this Act, to the extent any provision in chapter 11-54, Hawaii Administrative Rules, is inconsistent with this Act, those provisions shall be superseded. Water quality standards not inconsistent with this Act shall remain in effect.

SECTION 5. If any provisions of this Act, or the application thereof to any person or circumstances, is held invalid, the invalidity does not affect other provisions or applications of this Act which can be given effect without the invalid provision or application, and to this end the provisions of this Act are severable.

SECTION 6. This Act shall take effect upon approval; provided that the specific water quality standards in this Act shall take effect upon their approval by the United States Environmental Protection Agency. Provisions in this Act relating to any particular pollutant or indicator organism shall

be repealed upon the approval by the United States Environmental Protection Agency of water quality standards for the pollutant or indicator organism identified in this Act, following the State's review and adoption of water quality standards pursuant to Section 303(c) of the Federal Water Pollution Control Act of 1972, as amended.

Hawaii's Thousand Friends

25 Maluniu Ave., Suite 102., PMB 282 • Kailua, HI 96734 • Phone/Fax: (808) 262-0682 E-mail: htf@lava.net

Hearing HTH-ENE 02-23-09

2/13/09 8:07 PM

THE SENATE
THE TWENTY-FIFTH LEGISLATURE
REGULAR SESSION OF 2009

COMMITTEE ON HEALTH
Senator David Y. Ige, Chair
Senator Josh Green, M.D., Vice Chair

COMMITTEE ON ENERGY AND ENVIRONMENT
Senator Mike Gabbard, Chair
Senator J. Kalani English, Vice Chair

NOTICE OF HEARING

DATE: Monday, February 23, 2009
TIME: 2:45 PM
PLACE: Conference Room 016
State Capitol
415 South Beretania Street

A G E N D A

SB 1008

RELATING TO WATER QUALITY STANDARDS.
Amends state water quality standards for marine waters to conform to federal standards.

HTH/ENE

Testimony

Status

Hawaii's Thousand Friends' Testimony on SB 1008 Fred Madlener, Board Member

Committee Chairs and Members:

Hawaii's Thousand Friends has been in the federal courts since the early 1990's to require the City and County of Honolulu to clean up its sewage outfalls. At the time we first intervened, the City and County of Honolulu was not even meeting primary treatment standards. They are not meeting them today. There is now an on-going water quality legal case that we are a party to, that allows us to intervene on the side of EPA, the U.S. Department of Justice, and the State of Hawaii Department of Health in their dispute with the City over the mismanagement of its sewage. We ask both of your Committees to not intervene in this water quality standards matter at this stage of the litigation, now approaching resolution, by setting your own water quality standards in this Bill. Such an intervention brings into play a whole range of Federal procedures, most of which you have had no time to consider in depth. There must be, and there is not, an administrative record to support the relaxation of the standards proposed by the Bill. The legislature cannot do this, and EPA cannot approve it without record support. This Bill ignores that Hawaii Water Quality Standards for pesticides were intentionally set at three times more strict than EPA's criteria to account for the higher levels of fish consumed in Hawaii.

Hawaii's Thousand Friends' Testimony on SB1008

The present water quality standards in Hawaii require that if bathers in Waikiki were to swallow a small amount of sea water that had 7 clumps of enterococcus per 100 milliliters in it, only 9 in 1,000 persons would sicken. The new standard would allow 35 clumps of enterococcus to be present per 100 milliliters and this would sicken 19 persons. Tourism is such an important part of our commercial life here that it makes no sense to jeopardize it by downgrading our standards.

We have attached a letter that details the process required by the EPA when it is asked to change its water quality standards. The letter is about Maine, but the circumstances are the same as the ones at issue here: the State of Maine is being asked by a group to intervene with EPA to get a standard downgrade. The public interest law firm writing the letter explains the process and gives reasons why it is not a sound initiative.

This Legislature is being asked to change a standard that is part of a national effort to clean up the nation's beaches and rivers. But it is asked to do so without the benefit of hearing the technical particulars recited by the parties in the dispute. We think this argument is best resolved in a venue that examines the technical facts and devises appropriate rules to deal with those facts. We don't want our tourists, or anyone, getting sick from being in our near shore waters.

The basic problem is that treating sewage so that it doesn't hurt us is a complicated and expensive proposition, and the City and County of Honolulu not only does not want to take the matter one inch farther than it must under the rules, but it wants you to change the rules so that it does not even have to go that far. Furthermore, the City is blaming everyone but itself for its failure to meet EPA and State standards. We recognize that neither mayor Frank Fasi nor mayor Jeremy Harris would upgrade the City's sewage effluent, and that Mayor Hanneman is now to deal with an old and intractable problem, but in this Bill his solution is to change the standards rather than upgrade the effluent.

February 22, 2009



Sierra Club Hawai'i Chapter

PO Box 2577, Honolulu, HI 96803
808.537.9019 hawaii.chapter@sierraclub.org

SENATE COMMITTEE ON HEALTH SENATE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

February 23, 2009, 2:45 P.M.

(Testimony is 4 pages long)

TESTIMONY IN STRONG OPPOSITION TO SB 1008

Aloha Chair Ige, Chair Gabbard, and Members of the Committees:

The Sierra Club, Hawai'i Chapter, with 5500 dues paying members statewide, strongly opposes SB 1008, which reduces the state water quality standards *to the lowest possible limit allowed under the law*. To have the legislature consider reduced toxicology standards -- without scientific evidence or studies establishing the effects this will have on Hawai'i waters -- is troubling, particularly when the sole basis for this move is to help the City and County of Honolulu put *less* into repairing its outdated and broken sewer system.

A. *The Impact on Public Health and Our Marine Ecology.*

Why should the legislature enter into the complex field of water standards -- evaluating the impacts of contaminants (pesticides, heavy metals, bacteria, pathogens, and particulates) on freshwater and marine life -- without any scientific application in Hawai'i? Federal standards, based on East Coast studies, have previously been rejected because residents of Hawai'i consume more fish and utilize our sub-tropical beaches year-round.

Further, fragile coral reefs around the state are disappearing. Some reef fish are so full of toxins that people are advised not to eat them before testing. Do we really want to take a step that may expand this process, rather than waiting to have scientific certainty?

B. *Fixing the City and County of Honolulu's Sewer System.*

The City and County of Honolulu previously argued the water quality standards must be lowered so as to minimize the fines imposed for years of neglect to Honolulu's sewer system. What the City failed to mention, however, is that the Sierra Club and other environmental groups has publicly stated -- and the federal judge has agreed -- that *every penny in fines imposed should be spent fixing Honolulu's sewer system*. In other words, if the sole basis for rushing to reduce the water quality standards is because of the ongoing litigation, then such a move will only reduce efforts to improve Honolulu's wastewater system.

C. No Evidence the Lowered Standards Offer Sufficient Protection.

Looking at Section 1 and 2 of SB 1008, there is no evidence that lowering our water quality standards would offer sufficient protection to human and marine health. These federal standards were developed based on national models -- infrequent use of marine waters, reduced fish consumption, and no tropical reefs or fish -- and no study has been presented establishing these standards are applicable to Hawai'i. Consider:

- Do we know the impact of lessening the Chlordane standard by making it *five times lower*?¹
- Do we know the impact of lessening the Dieldrin standard by making it *two times lower*?²
- **Hawai'i consumes more fish!** Hawai'i previously set stricter pesticide limits because it was concluded we eat 3.1 times more fish than the national average.³ National standards are modeled on a lower consumption of fish per person.
- **Hawai'i coral reefs are already imperiled.** Hawai'i's fragile reefs, which are critical to the preservation of our beaches, marine life, and tourism economy, are already afflicted from a host of adverse factors. What will be the impact of decreased water quality standards, such as increased pesticide levels?
- **Many states have established stricter standards than the EPA guidelines.** For example, California's dieldrin standard is 0.00004 and its chlordane standard is 0.000023 micrograms per liter. Oregon's dieldrin standard is 0.0000076 and its chlordane standard is 0.00046 micrograms per liter. Pristine water is far more critical to our economy and way of life than these two states. Don't we also want strict standards?



¹ This assumes the proposed chlordane standard of 0.00080 divided by the corrected standard for fish consumption of 0.00016 established in Hawai'i Administrative Rules § 11-54-4, dated August 31, 2004. Utilizing the uncorrected current Hawai'i Standard results in a standard *fifty times lower* than the current standard.

² Based on the proposed dieldrin standard of 0.000052 micrograms per liter divided by the 0.000025 current standard.

³ As noted in the attached Declaration of Laurence K. Lau, the Deputy Director of Health for the State of Hawai'i Department of Health, Hawai'i's Water Quality Standards for "fish consumption standards are 3.1 times more stringent than the EPA Criteria, because the average daily consumption of fish locally was estimated to be approximately 3.1 times higher than the average underlying the EPA Criteria."

D. Recreational Use of Waters Five Hundred Meters from Shore.

Turning to Section 3, it is unclear how someone could conclude “waters between five hundred meters and three miles from shore [are] infrequent use coastal recreation waters”

“Infrequent use coastal recreation waters” are defined under federal regulations as “coastal recreation waters that are rarely or occasionally used.” Doesn’t this definition require a beach by beach analysis? Surfers frequently paddle out five hundred meters or more along the south and east coasts of Oahu (like Waikiki). Paddlers go out even further and frequently swim in the water during relays and races. This list could go on.

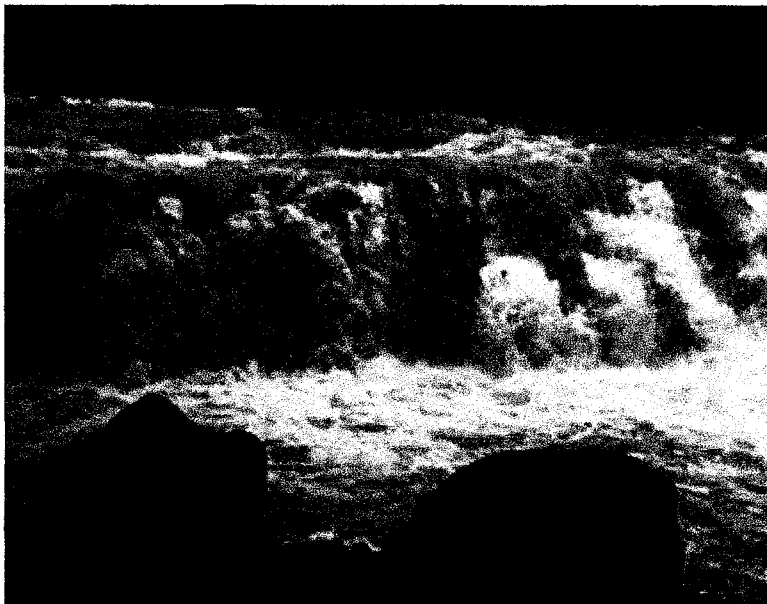
Coastal boundaries should be set through a process of thorough data collection and analysis. Each beach has seasonable changes in stratification and upwelling, which can bring deep offshore waters to the surface as a function of temperature gradients, wind speeds, and tidal direction. Each beach is used differently by recreational users. Each beach has different marine ecosystems. The proposed boundary, however, is finite and arbitrary. Unfortunately, the health consequences of such a measure is anything but arbitrary.

E. No Water Quality Standards?

As currently phrased, Section 4 could result in the elimination of all “inconsistent” regulations. Under the Federal Clean Water Act, no water quality standards can be adopted until they are approved by the EPA. Section 4 voids all inconsistent standards, meaning the current standards, boundaries, and other regulated matters would be void if the EPA takes time to review the proposed lowered standards or denies the request.

F. No Scientific Evidence or Public Review.

It should also be noted that no scientific analysis has been made available to the public justifying the lowered water quality standards stated in SB 1008. See 40 C.F.R. § 131.20(b) (“The proposed water quality standards revision and supporting analyses shall be made available to the public prior to the hearing.”). Nor can the legislative process establish a factual record sufficient for federal review. See 40 C.F.R. § 131.10. As such, the process for adopting SB 1008 violates



federal regulations. The EPA cannot approve these water quality standards.

G. No Reason to Rush.

Before we rush to amend the State's water quality standards, we should allow the administrative process to proceed. To this end, the administrative rules governing this area were just amended in 2004 -- is there really a rush to act on standards that were last considered five years ago? Particularly when the Department of Health has committed to amending these rules? There is, quite simply, no reason to rush to arbitrary and unscientific standards. If the administrative process is not proceeding expeditiously enough, then there are other methods to follow aside from putting our public health and our marine ecosystems at risk.

Thank you for this opportunity to provide testimony.

From: KEALIA GEDAYLOO-SUDDEN [kealiajgs@hotmail.com]
Sent: Sunday, February 22, 2009 5:56 PM
To: HTHTestimony
Subject: hawaii waters

Aloha,

To whom this may concern, I strongly oppose SB 1008 and the companion House Bill 834! Hawaii is a tourist destination!!!!!! How are the tourists going to feel when there are no coral reefs left to dive on and no fish left in the sea...help hawaiian waters! Do not let the high standards of clean water slip now! mahalo for you time,
Kealia Suddden

Windows Live™ Hotmail@:...more than just e-mail. [Check it out.](#)

From: ESmith1703@aol.com
Sent: Sunday, February 22, 2009 4:57 PM
To: HTHTestimony
Cc: Rep. Marcus Oshiro; Rep. Marilyn Lee; Rep. Henry J.C. Aquino; Rep. Karen Awana; Rep. Tom Brower; Rep. Isaac W. Choy; Rep. Denny Coffman; Rep. Sharon Har; Rep. Gilbert Keith-Agaran; Rep. Chris Kalani Lee; Rep. Scott Nishimoto; Rep. Roland Sagum; Rep. James Tokioka; Rep. Jessica Wooley; Rep. Kyle Yamashita; Rep. Kymberly Pine; Rep. Gene Ward
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M (also HB 834)

Testimony in Opposition to SB 1008

Chair Gabbard and members of the Committee:
(I have never done this by email, so I trust this is acceptable)

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawaii's water quality standards. I have been a scuba diver and my partner has been a sailor for years. Hawaii's waters are great, but not perfect. Don't make them less so.

I also regularly check on the water quality of what we drink and am sorry to know that many places on Oahu do not now have a great water as we do in Kailua.

Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing.

I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawaii.

Thank you,
Elbridge W. Smith
1583 Ulupuni St
Kailua, Hawai`i 96734
261-6929

A Good Credit Score is 700 or Above. See yours in just 2 easy steps!

From: Steve Carll [stevecar@lava.net]
Sent: Sunday, February 22, 2009 4:22 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

I have two young children, ages 4 and 7. The four-year-old, my daughter Lucy, has Crohn's Disease, an autoimmune disorder, so her health is particularly vulnerable to negative changes in her environment. Please don't allow her--or any of our--environment to become more toxic.

*Sincerely,
Steve Carll
1673 Paula Dr.
Honolulu 96816*

From: Theresa - kai [kai_wahine@hawaii.rr.com]
Sent: Sunday, February 22, 2009 4:12 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Submitted by email February 22, 2009; 3:51 PM approx.

Chair Gabbard and members of the Committee:

As residents of Hawai'i Island we strongly oppose SB 1008 (and the companion House Bill 834) which seriously reduce Hawai'i's water quality standards, and appear to do so with short or inadequate notice to the public at large. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. There is no evidence that increasing toxic pollutant levels will NOT, in the mid to long term, irreparably harm our marine sanctuaries, fisheries, and environment. With increased development and the use of pesticides and fertilizers close to the ocean and watersheds it is neither prudent nor logical to relax any safeguards. Therefore we cannot support.. and strongly urge the Committee, to oppose a proposal that would double or triple the amount of pesticides and bacteria allowed in the water. In this time of rapidly disappearing eco-systems we need to pursue even more aggressive measures to protect and restore marine environments.

Respectfully Submitted

William and Theresa Maris
68-1376 S. Pauoa Road B22
Kamuela, HI 96743

From: Katie Stevens [katelibu@gmail.com]
Sent: Sunday, February 22, 2009 10:58 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the committee,

Hello, I am writing in regards to SB 1008, i am in great opposition of this passing. we currently do not do enough to protect our water quality. I am constantly hearing of spills, and waste being released directly in to our waters. Our storm drains are also not treated, and we are always working to prevent people from polluting in to them because of lack of knowledge. With our tourism also being so down, shouldn't we strive to offer themthebest experiences so that they return again, and share their stories with others? There are already so few good snorkeling spots to enjoy, the colors are fading, and the fish are becoming harder to see due to our lack of care of our run off. What about our delicate water table for the people that live here? Or our health for our keiki who swim and play in rivers and pools. It is our job, and priority to improve and instill more protections than to lower our standard of living and health. Please do not allow this to happen, our hope is in you.

Thank you so much for your time,

Katie Stevens
2042 Nu PL
Honolulu, HI 96817

From: Safari Studios [safari studios@hotmail.com]
Sent: Sunday, February 22, 2009 1:08 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i. Please wake UP! Don't be like California and New York where the once pristine water's are disgusting. I am in the water several times a week and can see them declining just in the 7 years I've been here.

Sincerely,

Marina Curtis

HC2 Box 6965

Keaau, HI 96749

From: Cory (Martha) Harden [mh@interpac.net]
Sent: Sunday, February 22, 2009 8:36 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008
Chair Gabbard and members of the Committee:

MORE pesticides and bacteria in our water?????

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i.

mahalo,

Cory Harden

PO Box 10265

Hilo, Hawai'i 96721

808-968-8965

mh@interpac.net

From: Cathy OLeary Carey [cathycaper@sbcglobal.net]
Sent: Saturday, February 21, 2009 4:25 PM
To: HTHTestimony
Subject: Testimony%20in%20Opposition%20to%20SB%201008,%20February%2023,%202009%20at%202:45%20P.M.

Testimony in Strong Opposition to S D 1008

Chair Gabbard and members of the Committee:

We have resided in Makaha Valley part time since 1978 and enjoy diving in the beautiful Hawai'ian underwater environment.

We are strongly opposed to S D 1008 which will reduce Hawai'i's water quality standards.

With an increase in population on our relatively small islands there should be higher quality water standards not lower to protect citizens well being.

Toxins have already compromised our coral reefs and this awful proposal would allow an increase of pesticides and bacteria in our waters.

As ocean users, we demand high water quality standards to protect our island waters and oceans.

Sincerely,

Cathy O'Leary Carey and John Carey

Cathy OLeary Carey

From: joy wall [rainforestjoy@yahoo.com]
Sent: Saturday, February 21, 2009 4:18 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair gabbard and members of the Committee:

I strongly oppose SB1008 and the companion House Bill 834, reducing Hawaii's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some of our reef fish are so full of toxins , people are advised not to eat them without testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a through scientific analysis of how this would impact Hawaii.

Sincerely,

Joy Wall
PO Box 6184
Ocean View, HI 96737

From: Elizabeth Dunne [emkdunne@gmail.com]
Sent: Sunday, February 22, 2009 8:53 PM
To: HTHTestimony
Subject: Testimony in Strong Opposition to SB 1008 2/23 at 2:45

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. A proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i is unacceptable. Before any change is made to the water quality standards, Hawai'i must undertake scientific review, with public input, of each beach and stream.

Mahalo for this opportunity to testify.

Elizabeth M. Dunne
Honolulu, Hawaii 96817

From: Jim Shakespeare [jim_hesse@hotmail.com]
Sent: Saturday, February 21, 2009 3:01 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

**Please oppose SB 1008 and HB
834 and keep our islands
clean! Malama pono....**

From: Surfing Medicine International [surfingmedicine@gmail.com]
Sent: Wednesday, February 11, 2009 7:42 PM
To: info@barackobama.com; governor.lingle@hawaii.gov; senate@hawaii.edu; APereira@khon2.com
Subject: Hawai'i State Legislature to hold hearing to force Hawai'i State Department of Health Clean Water Branch to enforce marine water quality laws, and why they should enforce federal marine water quality laws

Categories: Green Category, Blue Category

Aloha everyone!

As a Master of Science researching tropical island stream ecosystems and water quality issues for about 14 years in The Caribbean, Micronesia, and Hawai'i, I am ecstatic that the State Legislature of Hawai'i is holding a hearing that could lead to forcing the Hawai'i State Department of Health Clean Water Branch (HI DOH CWB) to conform to federal USEPA marine water standards regarding enterococci (a fecal bacteria found in feces of humans and animals). The hearing will be at:

DATE: Monday, February 23, 2009
TIME: 2:45 PM
PLACE: Conference Room 016, State Capitol,
415 South Beretania Street, Honolulu,
HI

This hearing is long, long overdue. The State of Hawai'i Department of Health Clean Water Branch has been using Dr. Roger Fujioka's enterococci soil and water research from O'ahu and Guam (Hardina and Fujioka, 1991) (Fujioka et al., 1999) to claim that because Dr. Fujioka found enterococci in soils and waters of lower elevation O'ahu and Guam that exceed USEPA standards, that the enterococci must be from a non-fecal source, thereby giving the HI DOH CWB a reason to not put warning signs on beaches during USEPA enterococci marine water quality exceedances. But the truth is, that too many people and out of control feral animals inhabit the islands of Guam and O'ahu from summits to sea unfortunately almost everywhere. For three years, I worked on Waipa of North Side Kaua'i to collect data from mountains to sea under grants funded by U.S. Department of Agriculture which disproved Dr. Roger Fujioka's claims on non-fecal sources of enterococci in Hawaiian waters and soils, meaning that in 75% of my soil samples, I found no enterococci in the majority of my soil samples using published methods to test the soil using methods from Shibata et al, 2004, and I found significant differences between no enterococci in the soil on North Side Kaua'i versus upwards of a Most Probable Number (MPN) of thousands of enterococci/g of manure. Looking at population density alone on O'ahu versus Kaua'i could tell us a lot about enterococci. I strongly believe that there is much more poop on O'ahu than Kaua'i. You can also see, and use this presentation for the hearing of my fecal research on Kaua'i which I presented at the Hawai'i Conservation Conference 2007 on film at:

<http://video.google.com/videoplay?docid=-6419065817473252192&pr=goog-sl>

For three more years (2006-2009) since leaving Kaua'i, I have worked on the summits of the Ko'olau mountains of O'ahu as Field Crew Supervisor for the Ko'olau Mountains Watershed Partnership, during which time I have collected more data on a summit U.S. Fish and Wildlife Refuge in a collaborative project with Surfrider Foundation, UH Manoa, and USFWS that further disproves Dr. Roger Fujioka's claims that enterococci in marine waters of Hawaiian islands comes from non-fecal sources in soil. I used published methods to test the

soil on Ko'olau summits copying methods used to test soil by Muirhead et al. My overall research shows that when pigs damage streambanks, and that when invasive species (people and ungulates) enter native ecosystems, then, and only then will enterococci levels in soil increase. Poop does not fall out of the sky. It comes from animals and people. It's actually really a simple concept that can be summed up as follows:

- Native Undisturbed Forest in Hawaii=no enterococci in soil and water
- Forests in Hawaii with pigs, rats, mongoose, birds, wallabies, geckos, frogs, goats, and too many people=lots of enterococci in your water and soil on O'ahu. Remember, original ecosystems of Hawai'i had no ungulates or people. The people arrived with pigs, rats, mongoose, birds, wallabies, frogs, goats, and more people...

Sincerely,

Guy Ragosta, M.S.
President
Surfing Medicine International

P.S. I would like to testify at the upcoming hearing. I am an expert witness on this issue that has collected more data to disprove Dr. Fujioka than anyone in the Hawaiian islands. I was accepted as a PhD student at UH Manoa, and all professors on my M.S. committee agreed I was ready to pursue a PhD to investigate Dr. Fujioka's claims. The only professor that dropped off my committee was Dr. Fujioka. It's about time that the State of Hawai'i warns marine water users that they might get sick if they swim in waters that exceed USEPA marine water quality enterococci standards. Until someone does an epidemiological study linking illness rates of marine water users to levels of pollution in marine waters of Hawaiian islands, the State of Hawai'i Department of Health Clean Water Branch has absolutely no valid reason to not enforce USEPA Marine Water Quality Standards on all beaches of Hawai'i. Native Ecosystems all over the Ko'olau in O'ahu are at an urgent point of no return from mountain to sea. Anyone who needs an expert testimony for this hearing regarding North Shore O'ahu Federal Fresh and Marine Water Quality Violations for this hearing should contact Dr. Yost (rsyost@hawaii.edu) at the Tropical Plant and Soil Science Department.

In summation, a good first step requires putting warning signs in noticeable places on Hawaiian beaches where federal marine water quality standards have been exceeded in order to warn people that use the marine water that they might get sick due to high enterococci values. It would also help to compensate local people who have become ill during the time over the last many years that they have used marine waters that coincide with times that Hawai'i State Department of Health has negated to warn and/or enforce USEPA Marine Water Quality Standards regarding enterococci. Erin Brockovich actually settled out of court recently on a case against Dole for people in Central O'ahu getting mutations due to poor agricultural practices over the years. For the State to not warn people regarding federal marine water quality standards based on biased site sampling and presumptuous claims on illness rates of marine water users is not only risky, it needs to be changed. Without change, there is no future.

Enforcing marine water quality laws on tropical islands of Hawai'i regarding enterococci standards will send a message to tropical island nations round the world like Haiti, Jamaica, Micronesia, Tahiti, and more, that until someone proves otherwise, the State of Hawaii should follow the USEPA standards, and that perhaps other tropical island nations should follow suit. From there, they can use best management practices like riparian buffer zones to intercept pollution before it reaches the waters, and they can also use easy devices like IDEXX to test their water cheaply following USEPA standards. There is a reason dysentery kills so many people in tropical nations: because the water is dirty, and needs to be cleaned.

Today, I sent my research paper from Kaua'i: 'Enterococci Surface Soil and Water Analysis of a Rural Tropical Island Stream and Tributaries' to the Hawai'i State Legislature in order to testify at the upcoming hearing. My most recent research with USFWS, Surfrider Foundation O'ahu, UH Manoa, and Ko'olau Mountains Watershed Partnership regarding enterococci soil and water analysis of the Kipapa and Waikakalaua summit headwaters is almost finished, and I have been requested by USFWS to not share the data analysis until the research is complete, which should be by June 2009. Until now, no one had bothered to check and see if native forest soils on summits of O'ahu have enterococci in the soil, because you need a helicopter to come and go from the areas in a timely manner or the enterococci soil results will be void, hence no one did it until I decided to. Overall, I am concerned for friends I know on tropical islands all over the world. They all need, and deserve enforceable marine water quality laws.

Finally, here's a link to a really great book that we all can relate to: Everyone Poops by Taro Gomi. I read it; and understand it. Maybe we can start by distributing the book Everyone Poops to all elementary school classrooms as mandatory reading on the Hawaiian Islands, using O'ahu as a pilot project. How many people do you know that have moved to Hawai'i to study fecal matter? I don't do this to waste my time. I am seriously concerned about public health of my friends in the Hawaiian islands, and tropical islands worldwide.

Sincerely,

Guy Ragosta

Surfing Medicine International, 501(c)(3)

"To support, research, and create botanical remedies for cancer and water pollution"

official website: www.surfingmedicine.org

charity album website: www.myspace.com/surfingmedicineinternationalcharityalbum

Elsevier Editorial System(tm) for Journal of Environmental Management
Manuscript Draft

Manuscript Number: JEMA-D-07-00916R1

Title: Enterococci surface soil and water analysis of a rural tropical island stream and tributaries

Article Type: Research Paper

Keywords: fecal bacteria, Enterococcus, Tropical Island, water quality

Corresponding Author: Mr. Guy Ragosta, Master of Science

Corresponding Author's Institution:

First Author: Guy A Ragosta, Master of Science

Order of Authors: Guy A Ragosta, Master of Science; Mark Walker, PhD; Carl Evensen, PhD

July 8, 2008

Dear Journal of Environmental Management,

I have worked diligently with co-authors Dr. Carl Evensen and Dr. Mark Walker to address the reviewers comments regarding manuscript number: JEMA-D-07-00916, "Enterococci surface soil and water analysis of a rural tropical island stream and tributaries" for publication in Journal of Environmental Management. As you requested in order to consider the paper for publication, I have revised it substantially in accordance with the reviewers' comments, and proofread it carefully for typographical and grammatical errors. I look forward to hearing your decision.

Sincerely,

Guy Ragosta

July 9, 2008

Dear Alison Gill,

Below, you will find detailed responses to the reviewers comments for manuscript JEMA D-07-00916R1 entitled 'Enterococci surface soil and water analysis of a rural tropical island stream and tributaries'. I underlined my responses directly after each comment, question, and recommendation. I look forward to hearing your decision.

Sincerely,

Guy Ragosta

Ms. Ref. No.: JEMA-D-07-00916

Title: Enterococci surface soil and water analysis of a rural tropical island stream and tributaries

Journal of Environmental Management

Dear Dr. Ragosta,

Following this message are the reviews of the above-referenced manuscript.

We'll be glad to consider this paper for publication after it's been revised substantially in accordance with the reviewers' comments. Please proofread it carefully for typographical and grammatical errors.

Due to space limitations in the printed journal, we are requesting that all authors reduce the length of their papers by at least 10% if possible. If your paper

includes large tables or datasets, it is preferred that these be published as supplementary material in Science Direct rather than in print. Further information is provided at the end of this message.

With the revised manuscript, please provide a detailed response to the reviewers' comments, indicating how each comment is addressed in the revised manuscript. If you disagree with any of the reviewers' comments, please address them in a rebuttal.

To submit a revision, please go to <http://ees.elsevier.com/jema/> and login as an Author.

Your username is: *****

Your password is: *****

On your Main Menu page is a folder entitled "Submissions Needing Revision".

You will find your submission record there.

Sincerely,

Alison L. Gill

Editor

Journal of Environmental Management

P.S. Elsevier now accepts electronic supplementary material to support and enhance your scientific research. Supplementary files offer the author additional possibilities to publish supporting applications, movies, animation sequences, high-resolution images, background datasets, sound clips and more.

Supplementary files supplied will be published online alongside the electronic version of your article on Science Direct at <http://www.sciencedirect.com>. In order to ensure that your submitted material is directly usable, please ensure that data are provided in one of our recommended file formats. Authors should submit the material in electronic format together with the article and supply a concise and descriptive caption for each file. For more detailed instructions please visit our artwork instruction pages at the Author Gateway at <http://authors.elsevier.com/artwork>.

Reviewers' comments:

Reviewer #2:

REVIEW FORM

Recommendation:

- Accept without change
- Minor revision

Moderate revision

Major revision

Reject

Recommendations of acceptance without change or with minor, moderate or major revisions require that the answers to Questions 1-4 are all "yes".

1. Does the subject of the manuscript fall within the scope of the journal?

Yes If no, comments:

2. Is this a new and original contribution? (For review articles this does not necessarily apply.) An old model applied on a new case study is not considered a new and original contribution.

Yes If no, comments:

3. Are the results of sufficiently high impact and global relevance for publication in an international journal?

Yes If no, comments: But only if the suggested revisions are made.

4. Are the interpretations and conclusions sound, justified by the data and consistent with the objectives?

No If no, comments: The paper needs more focus, and yes, if rewritten as

suggested.

5. Is the organization of the article satisfactory?

No If no, comments: The paper needs a major rewrite as suggested.

I rewrote the paper, as suggested.

6. Does the manuscript demonstrate an awareness of other research on its topic?

Yes and No If no, comments:

7. Does the title of the manuscript clearly reflect its contents?

Yes If no, comments:

8. Is the abstract sufficiently informative, especially when read in isolation?

Yes If no, comments:

9. Are appropriate keywords provided?

Yes If no, comments:

10. Does the introduction set the manuscript in an international context and show how it builds on previous work on the subject ?

Yes If no, comments:

11. Is the statement of objectives of the manuscript adequate and appropriate in

view of the subject matter?

No If no, comments: The objective is not clearly stated, and the hypothesis claimed to be tested is stated in the experimental section instead of the Introduction. I stated our objective and hypothesis more clearly in the manuscript in the last paragraph of the introduction section.

12. Are the methods correctly described and sufficiently informative to allow replication of the research?

No If no, comments: The experimental design and statistical analysis are inadequately presented. The experimental section need more focus. I refocused the experimental design section, and provided relevant citations for the statistical analysis, for which I used the Kruskal-Wallis test.

13. If a model is presented, is the model presented in sufficient detail (including calibration, sensitivity analysis and validation) to allow the reader to develop and test the model?

Yes No If no, comments:

14. Are the results clearly presented?

No If no, comments: Some tables are not necessary; Fig. 3 is adds nothing to the paper, figures 4 and 5 are incomprehensibel, and Fig 7 is never discussed. The only figures now are maps of the watershed. I consolidated all the data into tables.

15. Is an appropriate statistical treatment of the results given?

No If no, comments: Only a cursory reference to a non-parametric test (Kruskal-Wallis) was made in the Results section.

I cited relevant literature regarding the use of the Kruskal-Wallis test.

16. Are the results duplicated in the figures, tables and text?

No If yes, comments:

17. Are the figures and tables all necessary and are the captions adequate and informative?

No If no, comments: See comment #14.

18. Can any of the tables or figures be combined?

No If yes, comments:

19. Is the length of the manuscript appropriate to the content?

No If no, comments: This paper can be greatly condensed.

20. Are the references adequate for the subject and the length of the manuscript?

Yes If no, comments:

21. Is the quality of the English satisfactory?

Yes If no, comments:

22. Can you suggest any reductions in the manuscript, or deletions of parts?

Yes Comments: Suggestions are in my review.

ADDITIONAL COMMENTS:

The authors present results of a study on the spatial and temporal distribution of fecal enterococci in a tropical island stream and tributaries. Although not stated directly in the Introduction, the authors hypothesized "that land uses could be related to enterococci occurrence in fresh waters." The experimental design for testing this hypothesis is not well or clearly presented. This hypothesis was stated in the Experimental section when it should have appeared in the Introduction as an objective of the study. The implicit objective of the study (as this reviewer interprets the last paragraph of the Introduction—note that page numbers are missing) was to counter the idea that tropical soils, not necessarily fecal material directly, are sources of fecal enterococci in streams, with data that supports the idea that wild-life, animal husbandry, and anthropogenic perturbations are the actual sources of the enterococci detected in stream. I addressed your concerns regarding the clarification of the hypothesis and objective, and rearranged it to be in the introduction section. We hypothesized that riparian soil and water on a rural tropical island of Kaua‘i, Hawai‘i did not contain free-living sources of enterococci, but that feces from animals were potential sources of enterococci for a small perennial stream in the watershed.

The Experimental section can be both condensed and made more comprehensive. Important points appeared to be missing such as how the composited soil samples were mixed before subsampling for analysis (I added in a more comprehensive explanation of the mixing of composite soil samples). The section on IDEXX methodology can be condensed and does not need justification or details since many published papers can be cited (I condensed this section by citing relevant research and condensing the IDEXX protocol for running the soil tests). A section on data analysis would help clarify the experimental design as well as strengthen the data presentation. For example, under section 3.3, what statistical method was used to demonstrate significant differences between means? The authors stated that "site six had a much higher geometric mean of enterococci during July 2004 compared to site seven," and "a very high geometric mean for enterococci for water samples..." but they failed to indicate that these differences were statistically significant. We added the statistical significance for water samples for enterococci water and soil samples. Specific comments:

Figure 7 is not found in the Results section. If not referred to it must be deleted. figure 7 has been deleted.

As mentioned, no page numbers are indicated. page numbers have been inserted.

Parts of the Results section that discuss results need to be removed and included in the Discussion section. For example, in the third paragraph of section 3.3 (lines 3-9): "it is possible....in Waipa stream." The narrative on rain storms in the last paragraph of this section should be put into the Discussion section. i did this.

Section 3.4 does not present results and would be more appropriately included in the Discussion section. (I fixed this.)

The claim that the data supports the use of fecal enterococci as an indicator organism is not supported by any argument that is convincing. And the question arises, since fresh water samples were assayed for fecal indicator bacteria, why were fecal enterococci chosen over E. coli when the latter is the organism of choice for fresh water, and the former for marine waters? (I reworded this phrase as 'The lack of a scientific and methodical epidemiological study correlating pathogenic ambient water quality with illness rates in Waipa and all the Hawaiian islands still raises questions about which pathogenic water quality indicator, including but not limited to enterococci, works best in tropical islands.

That three out of four subsamples of soil per site were below detection limit may be an indication of a negative binomial distribution of the enterococci, and would suggest that clusters of enterococci occur where feces has been (randomly?) deposited presumably by wildlife. I added this comment into the discussion.

The reference to Shibata et al. 2004 is missing a volume number. I added in volume 38.

Table 2 has no relevance unless it can be connected to soil concentrations of enterococci.

table 2 was removed

The experiment that generated Table three only show to things: 1) soil dilutes the fecal concentrations of enterococci, and 2) that densities of enterococci populations vary with fecal samples. I added this in the discussion section regarding the data from table 3.

Figure 3 adds nothing to paper and ought to be deleted. Figure 3 was deleted. Figures 4 and 5 are incomprehensible. Note the typo in the legend of Fig. 4. I agree, I deleted figures 4 and 5. The data is all in Tables.

Reviewer #3:

This manuscript provide a set of Enterococci counts from a diverse array of sampling points in surface soil and water on a rural tropical environment. Taking into account the lack of available data in this kind of environment, we consider that this paper can be a valuable resource for health related water microbiology researchers and managers.

1. Does the subject of the manuscript fall within the scope of the journal?

Yes

2. Is this a new and original contribution? (For review articles this does not necessarily apply.) An old model applied on a new case study is not considered a new and original contribution.

Yes Comments: The lack of fields studies concerning the health related water microbiology in Tropical Island, justify, in my point of view, the publication of this paper. This work can be a valuable reference for other researchers.

3. Are the results of sufficiently high impact and global relevance for publication in an international journal?

Yes Comments: Even is this work is limited to one site study, the actual controversy in the scientific community about the suitability of traditional fecal indicators in tropical environments need to be enriched with field studies like this one.

4. Are the interpretations and conclusions sound, justified by the data and consistent with the objectives?

Yes, but the discussion as it stands is poor and need more bibliographic references. It is a pity that intense rainfall events were not considered separately as they have a major impact on the soil leaching and the transport of bacteria

from soil to rivers. It is also a pity that E.coli counts were not included as is one of the most accepted fecal indicator and also concerned by the discussion about their suitability for tropical environments.

I added more bibliographic references to the discussion. We could not include everything in this study, such as E. coli, rainfall analysis, soil moisture, stream temperature, etc. We initially considered incorporating soil leaching research, but ran out of time and funds. I agree though, it is needed information.

5. Is the organization of the article satisfactory?

No, The objectives and hypothesis of the work are in the Material and Method section, and the conclusion can be separated from the discussion. A very short and concise conclusion resuming the results and their relevance can be added.

I added a short and concise conclusion section separate from the discussion. I also added a separate objectives and hypothesis section outside of the M and M section.

6. Does the manuscript demonstrate an awareness of other research on its topic?

No, the manuscript lacks of references, there are many papers availables touching the presence and abundance of fecal bacteria in "pristine sites" in soil and waters and about the possibility of growing of these bacteria in tropical environment. There are also many works about the transfer of fecal bacteria from soil to streams taking into account different land uses and even if the majority of those works were performed in temperate countries, these data can be compared.

I added many more references, from Puerto Rico, Gerba, Uganda, buffer zone citations from Atwill et al, Lin et al from JEM, and more.

7. Does the title of the manuscript clearly reflect its contents?

Yes

8. Is the abstract sufficiently informative, especially when read in isolation?

Yes

9. Are appropriate keywords provided?

Yes

10. Does the introduction set the manuscript in an international context and show how it builds on previous work on the subject ?

No Comments: All the references cited in the introduction concern research done in Hawaii. Taking into account others works performed in other tropical environments (some works from Puerto Rico and Ouganda are availables) will be useful to place this work in an international context and discuss about contradictions found in differents studies.

I added citations from works in Uganda and Puerto Rico

11. Is the statement of objectives of the manuscript adequate and appropriate in view of the subject matter?

No, the objectifs are not clearly stated, they are mixed in the material and

methods section with the study site description. The best will be to add a paragraph at the end of the introduction with clearly enounced objectives.

I added a short objectives section directly after the end of the introduction

12. Are the methods correctly described and sufficiently informative to allow replication of the research?

Yes but the objectif and hypothesis of the work should be removed from this section and a short "study site" subsection should be rewrite in the M&M. A short "statistic analysis" subsection could also be added to a better understanding of the analyses presented latter (Kruskal-Wallis, Poisson's law for the MPN, a significative difference is presented in 3.3 section but the test used is not indicated).

I added a short study site subsection in the M&M. I added a statistic analysis section citing why we used Kruskal-Wallis.

14. Are the results clearly presented?

Yes

15. Is an appropriate statistical treatment of the results given?

Yes

16. Are the results duplicated in the figures, tables and text?

No

17. Are the figures and tables all necessary and are the captions adequate and informative?

No. Comments: In the table 2 an average is presented but the number of samples is not indicated. In the table 3 the minimum and maximum values should be added. In figures 4 and 5 the use of a single graph with sampling dates in x axis could facilitate the comprehension. In figure 7 the dates can be added in the legend and not in the figure

I deleted figures 4, 5, and 7. I reorganized the tables as well to make the data more comprehensible, and more condensed to cut back on space.

18. Can any of the tables or figures be combined?

Yes figures 1 and 2 can be combined.

19. Is the length of the manuscript appropriate to the content?

Yes

20. Are the references adequate for the subject and the length of the manuscript?

No, this paper needs more references and more discussion based in the literature available. I added many more references.

21. Is the quality of the English satisfactory?

Yes

22. Can you suggest any reductions in the manuscript, or deletions of parts?

No

Reviewer #4:

This is a well written paper that describes an important, interesting study about the use of enterococci as a water quality indicator in a tropical setting. Thus far, the only published studies from the state of Hawaii on fecal indicators in streams were conducted on Oahu and have reported that enterococci are present in soils and sediments and cannot be used as water quality indicators. This appears to not be the case on the north shore of Kauai. Thus, this paper adds an important piece of information to the literature and will be used by many and contribute important information. The authors have done an excellent job explaining their methods and conducted appropriate controls to convince this reviewer that the results they present are real.

My main criticism of this paper is the state of the figure and tables. There are in very bad shape and need to be improved immensely in order to improve readability and be publishable. If the authors do not have the appropriate software for making the figures readable, then they should make all the figures into tables. They could even just report the latitude and longitude of sampling sites so that a map is not needed.

I made all the figures, except for the maps which were fixed, into tables.

If a resubmission is requested, this reviewer suggests that page numbers be added to the manuscript as well as table and figure labels on each page with a table/figure so that reviewers can find the tables and figures easily.

I added page numbers to the manuscript.

Below is a list of suggestions for improving the paper.

1) Keywords: IDEXX should not be included as a keyword. This paper is not about IDEXX

I took IDEXX out as a keyword

2) The word "enterococci" should not be italicized or capitalized. It is not a species name. It describes a group of bacteria. "Enterococcus", on the other hand, should be italicized, but the authors do not use Enterococcus.

I did not italicize enterococci

3) Abstract, line 41. It is not clear what the controls in this sentence refer to. I reedited the abstract completely, and this has been fixed.

4) Figure 1 is unreadable and blurry. It is not publishable quality. I fixed Figure 1, made it black and white into what I believe is publishable quality, but that's for you guys to decide.

5) Section 2, line 7 . Add a reference for where the species, groundcover and

plant canopy are reported.

I added the reference, which is for another paper I recently submitted to Pacific Science journal, and I should know in about 7 weeks if it gets accepted for publication.

6) Section 2.1, second page, line 17. Why was it necessary to filter the water with a 30 um filter?

It was the method used by Shibata et al. 2004 method, which we followed for this research for testing soil samples.

7) Section 2.3. How many samples were collected from each sampling site on each day? I gather from some of the results description that more than one sample was collected but it isn't entire clear from this.

I reworded this in the paper, but it was 3 replicate water samples at each water quality monitoring site. We randomly located 4 plots within each section (Figure 2) and randomly sampled surface soil (0-5 cm) from 4 locations per plot from June through August 2005.

8) Section 3.2 As an aside, there is no reason to log-transform data prior to a non-parametric test.

I took out the log-transformed data, and performed the non-parametric test without transforming the data.

9) Fig. 4 is impossible to understand. It has no x-axis. It should be removed and a table used in its place. Because Fig. 4 is so hard to read, it is difficult to understand what is meant in lines 16 and 17 of section 3.3.

I deleted figure 4.

10) I do not understand what the authors are trying to say in lines 18-21 of section 3.3. First, the units of water concentrations are not MPN, they are MPN/100 mL. Second, this information should refer to a table or figure.

I fixed this.

11) Section 3.4, lines 1-2. The authors should include the word "likely" in this sentence since they did not observe this occurring directly.

this section was reorganized, and this sentence has been changed.

12) First page of section 4, line 22. You forgot the closing parenthesis.

this section has been reorganized, and the parentheses added.

13) Second page of section 4, line 4. Change die-off to survival.

I changed die-off to survival.

14) Authors should use SI units.

we refixed units that were not SI, and made them SI.

15) Table 3. For each row, is the same feces whose concentration of enterococci is reported for mixed with the soil sample in the same row (the 50/50 mixture)?

I separated these tables for the revisions. But, yes, I intended this to have the same feces in the same row for that fecal sample that was mixed with the soil 50/50.

16) Table 4. How many of the samples were averaged together for each geometric mean? 3 samples were averaged together for each site on each date to calculate the geometric mean.

17) Table 5. There is too much punctuation in each table entry. Is there a simpler way to show all the results? Perhaps standard deviation is not needed. I reorganized the data presentation in tables that I believe are much easier to read.

18) The maps are impossible to read.
the maps have been fixed.

19) Figure 2. Can the two panels be combined into one map? Otherwise make into a table with lat and long? The maps have been revised, but since I cut out so many figures and condensed the paper, I have included one map for water quality monitoring sites and one map for plot locations. I can make them one map if necessary, but I think the two separate maps give different detailed views of the stream section of Waipa watershed.

20) Fig. 3 is important, but it is blurry.
the figures have been condensed into tables.

21) Fig. 4 and 5. Why are the different sites separated between the two figures? What is on the x-axis? What are the three points for each site for each date? There must be a better way to show this data. Perhaps a table is the best way. The y-axes are not labeled either.

the figures have been deleted. 22) Fig. 6. I do not know that the rainfall time series is important to this paper. The times that the samples were collected should be added to the figure. The methods used to obtain this data should be described in the methods.

figure 6 was deleted.

23) Fig. 7 is not pleasant to the eye. If the authors do not have the means to make publication quality figures, then the figure should be changed into a table.
figure 7 has been deleted.

24) In the discussion section, the authors should compare their results to those of Fujioka and others on Oahu just to drive home the differences between the two study results. They did a good job reviewing the work of Fujioka et al. in the intro. this has been added to the discussion section.

25) The authors may want to include a bit of discussion about the results from temperate climates including Lake Michigan (Whitman and others) and California (Boehm) that show enterococci may sometimes be in sands and soils in these locations.

I included other discussion of results from Boehm, Atwill, Lin, and others in temperate climates.

Reviewer #5:

REVIEW FORM

Recommendation:

- Accept without change
- Minor revision
- Moderate revision
- Major revision
- Reject

Recommendations of acceptance without change or with minor, moderate or major revisions require that the answers to Questions 1-4 are all "yes".

1. Does the subject of the manuscript fall within the scope of the journal?

Yes If no, comments:

2. Is this a new and original contribution? (For review articles this does not necessarily apply.) An old model applied on a new case study is not considered a new and original contribution.

Yes No If no, comments: Similar work has been done in temperate climates but less is known about this behaviour in the tropics and therefore this makes it a valuable contribution.

3. Are the results of sufficiently high impact and global relevance for publication in an international journal?

Yes If no, comments:

4. Are the interpretations and conclusions sound, justified by the data and consistent with the objectives?

Yes If no, comments: The measurement of water content needs to be confirmed but even if it was miscalculated it does not represent a major problem

5. Is the organization of the article satisfactory?

Yes If no, comments:

6. Does the manuscript demonstrate an awareness of other research on its topic?

Yes If no, comments:

7. Does the title of the manuscript clearly reflect its contents?

Yes If no, comments:

8. Is the abstract sufficiently informative, especially when read in isolation?

Yes If no, comments:

9. Are appropriate keywords provided?

Yes If no, comments:

10. Does the introduction set the manuscript in an international context and show how it builds on previous work on the subject ?

Yes If no, comments:

11. Is the statement of objectives of the manuscript adequate and appropriate in view of the subject matter?

No If no, comments: While it is clear what they intend to do I have suggested that they be more specific about their aims and objectives at the end of the introduction.

A separate introduction and objectives section were added to assess the background information on this topic as an introduction, and investigate background levels of enterococci on a rural tropical island riparian soil and stream water ecosystem.

12. Are the methods correctly described and sufficiently informative to allow replication of the research?

Yes If no, comments:

13. If a model is presented, is the model presented in sufficient detail (including calibration, sensitivity analysis and validation) to allow the reader to develop and test the model?

Yes No If no, comments: N/A

14. Are the results clearly presented?

Yes If no, comments: Although some results are presented in tables and figures but not discussed in the text. This has been pointed out in the recommendations.

all tables and figures have been discussed and referenced in the updated manuscript.

15. Is an appropriate statistical treatment of the results given?

Yes If no, comments: Again I have recommended that they elaborate on why some of their statistical methods were chosen to help other readers who may be new to the field.

I did this.

16. Are the results duplicated in the figures, tables and text?

No If yes, comments:

17. Are the figures and tables all necessary and are the captions adequate and informative?

No If no, comments: Have made some recommendations
I deleted all the figures and used tables excluding figures for tables and maps.

18. Can any of the tables or figures be combined?

Yes If yes, comments: Table 1 with Figure 2

19. Is the length of the manuscript appropriate to the content?

Yes If no, comments:

20. Are the references adequate for the subject and the length of the manuscript?

Yes If no, comments:

21. Is the quality of the English satisfactory?

Yes If no, comments:

22. Can you suggest any reductions in the manuscript, or deletions of parts?

No Comments:

ADDITIONAL COMMENTS:

The one thing this paper really lacks is a good description of the soil. I appreciate that I may be slightly bias about this but in order to build up a better picture of when Enterococci are likely to survive in a soil it is important to be able to compare basic soil parameters e.g. structure, pH and water holding potential. Also, a better description of the soil would help explain the dominant pathway along which Enterococci may reach the watercourse.

I added preliminary pH, %OC, P, K, Mg, CA surface soil (0-5 cm) in a soil description of the site subsection. I used Kruskal-Wallis to assess significant differences along Waipa stream and the cattle pasture diversion ditch.

In general, an interesting piece of work that has used robust scientific method to achieve its aims. While not a unique study, certainly there are several similar documented studies that have occurred in temperate climates, the fact that it addresses these issues in a tropical climate makes it a valuable comparison study that I feel would be of interest to the wider scientific community.

There are a few issues that need to be addressed before this article could be published. I have listed my suggestions below which I hope the authors will find of use.

Page 3, line 20 (Standard Methods - 21st Edition: Check this reference, should it be American Public Health Ass, 2005?

yes, and I added the section p. 9-21

Page 4, lines 9-12, false positive results: Need to make it clear as to why Enterococci contamination from feces rather than soil is a false result when you argue that both could lead to Enterococci contamination, which is surely the problem?

it is still debatable which leads to contamination, soil and/or feces, but the lack of data from pristine tropical island watersheds regarding enterococci soil and water levels is very, very limited. I'm hoping to continue this research, and at the moment am hoping to investigate more on the summits of the Ko'olau mountains on O'ahu, for which we'll have to fly be helicopter to collect and transport out stream soil and water samples with Surfrider Foundation and U.S. Fish and

Wildlife...we'll see what happens! I've addressed your concerns in the paper..I think the problem is that the majority of data comes from heavily urbanized tropical islands, and the assumptions made by many scientists regarding the sources of enterococci have been extrapolated based on biased sampling site locations.

Page 5, lines 3-9: It is not clear to me as to why water samples collected by Hardina and Fujioka (1990) from Waimea River and the coastal zone of northern O'ahu should lead researchers to conclude that streams in Hawai'i contain environmental (soil) sources of Enterococci.

It is not clear to me either. I've been asking the Hawai'i State Department of Health the same question about why they support Fujioka et al.'s claims about how Hawaiian streams have environmental (soil) sources of enterococci for about 3 years now, and they tell me because Fujioka and some researchers on the mainland agree with them. It is a very, very intense topic of debate at meetings with Surfrider Foundation, US Fish and Wildlife, EPA, and others out here as to which indicator is best for tropical islands.

Page 5, line 9: It would be useful to include your specific aims and objectives to be covered in the paper at this point to help focus the reader
I did this.

P 5, Material and methods: The properties of soil can impact on the survival of bacteria therefore it would be very useful to have a better description of the soil(s) found in this location including properties such as pH and structure. I think you do go on to mention water content and temperature later on but it would be helpful to have a summary of those properties in this section. I added information on pH, OC, and nutrients as a preliminary description into the soils. \

Again you make a passing comment about a compacted soil later on, are all these soils considered to be compacted if not would you expect subsurface or overland flow to be dominant? I do not think the upland areas are compacted as much as lower elevation areas, and I tried to stress this in the updated manuscript.

Information like this is very useful to the wider community as it begins to build up a picture of which soil condition best suit the survival of micro-organisms.

Relating to the point above, how do you perceive Enterococci to move from the soil to the watercourse? Is it a subsurface process or is it a surface erosion process?

I think it's both, but I'm not 100 percent sure. I know one researcher in Hanalei was investigation enterococci in groundwater, and was finding that it was not a source, but this has not been published yet so it's preliminary. I think it moves through sand at different levels weather dependent and binds to sand well from the looks of the data.

P 6, line 4, it may be more helpful if you combine Table 1 and Figure 2.

P 6. line 7, Species, groundcover and plant canopy were measured in each plot and are reported elsewhere: Reported where? Do you mean later in the paper, if so not sure I found it or do you mean in another publication, if so it needs a reference.

I referenced this as a potential publication for Ragosta et al. in Pacific Science, and I will know in 7 weeks if it's accepted for publication.

P 7, line 11, A 3 gram subsample: change to 3 g subsample.

I fixed this.

P 7, line 21, from of: needs correcting.

I fixed this.

P 8, line 6, equation: Please check your equation and what you used in your calculations as water content is usually calculated as weight of water over weight of dry soil. Need to say what m is, I know we all know you mean mass but it is just one of those things. Also, you should really specify the units; I'm assuming you want to express water content as a percentage of g H₂O per 100g oven-dry soil. I presented the max and min high averages for H₂O content. Water content of soil samples was calculated as:

$$\text{WC} = (m_{\text{wetsoil}} - m_{\text{drysoil}}) / m_{\text{wetsoil}} * 100.$$

P 8, paragraph beginning line 10: I'm somewhat confused as to how using distilled water confirmed sterility of the equipment. I think this paragraph just needs to be rephrased.

I fixed this, and rephrased it as using sterile methods.

P 9, line 1, each person collected three 100ml water samples: Do you actually mean three replicate samples were collected from each sample point? I do hope so, as this is the standard method.

yes, it was replicate samples

P 9, line 12, Other water quality parameters: You present this data in Table 5 but there is no reference to Table 5 in the text and I do not remember it being discussed in the text. It is useful data, so I would encourage further discussion.

P 9, paragraph beginning on line 21: I'm confused as to what you mean by 100% cattle manure. My interpretation of this would be that it is only the manure with no soil. However, if this is the case, then I do not understand Table 3 (fourth column). If it is 100 % cattle manure, and you collected this from one location on the same day you collected soil samples then why do the concentrations vary? the manure tables have been separated, into one table for 100 percent manure, and another with the 50/50 soil/manure mix. Also, if it is only manure then how does it show that concentrations increase with increasing amounts in the soil? the data shows that when we added manure to the soil, the enterococci levels increased from when 0% manure was added to the soil. So basically, 100 percent soil=less enterococci, 50/50 manure/soil mix increased enterococci

levels, followed by an even further increase with 100 percent manure. I reorganized and expanded on this in the conclusion and discussion.

I think you need to expand on this a little more

P 10, line 5, 75% of composite soil samples tested were below the detectable limit: As you said earlier that you diluted these samples did you repeat any of the experiments using less dilution to see if anything could be detected?

I did not have time or funds to repeat the experiments using less dilution.

P10, paragraph beginning line 4: It would be helpful to some readers to explain why you chose to log-transform your data and why you then still chose to use a non-parametric test.

I chose in the revisions to not log-transform the data, as recommended by one of the reviewers. I explained and cited reasons for using Kruskal-Wallis.

P 10, line 17, Figure 4: Please check, is this Figure 4 or should it be Figure 5.

Figures 4 and 5 were deleted, and the data was organized into tables.

P 11, line 6, Kinzie et al. 2006: Kinzie et al., 2006

this reference was fixed.

P 12, line 21, you open brackets but do not close them. I think you meant to close them after Waipa on line 22. Please check.

I fixed this.

P 12, line 21, inaccessible: Just a thought but if it was inaccessible how did you get your samples? I assume you mean the majority of the catchment, away from the river, was inaccessible at this point.

I reworded this in the revised version, and took out inaccessible.

P 13 line 9, it's: Think this should be its, no need for the apostrophe.

Table 4: consider tidying up your decimal points.

I tidied up the decimal points.

Table 5: It would be helpful if you include the 0 in front of the decimal place e.g. Site 5 DO 0.7.

I did this.

Figure 2: Do the colours simply represent topography? Or, are populated areas shown on these maps? If so it would be worth pointing them out.

I revised the figure and made it B&W.

Figures 4 and 5: Need to show what the x-axis is.

figures 4 and 5 were deleted.

Figure 7: Not referred to in text.

General comments

In a list it is generally not necessary to have a comma (,) before and e.g. ferns, grasses, shrubs and trees.

Please check, but I think you should be using SI units and as far as I can remember feet are not an SI unit. If this is the case you need to check some of your tables (e.g. Table 1) and title text for figures, P 17.



Title:

Enterococci surface soil and water analysis of a rural tropical island stream and tributaries

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Abstract: This research investigated claims that enterococci were a free-living contaminant source in tropical island riparian soil and water in Hawai‘i. Researchers sampled surface soil (0-10 cm) in 24 randomly located plots and surface water at 7 water quality monitoring sites in Waipā watershed on the rural island of Kaua‘i along stratified sections of Waipā Stream, tributaries, and a cattle diversion ditch. There were no significant differences for surface soil enterococci values ($p = 1.0$), and three out of four subsamples of soil per section were below the detection limit (< 3.3 MPN/g). Also, enterococci levels in stream water samples were significantly higher ($p < .05$) at Mean Sea Level (MSL) near human habitation versus 220 m above MSL in riparian forests uninhabited by people. Enterococci increased downstream in water samples possibly due to the lower floodplain cattle pasture diversion ditch that pumps surface runoff into the stream mouth, and relatively unmanaged feral animal non-point fecal matter deposited at varying densities throughout Waipā’s drainage ecosystems.

Key Words: fecal bacteria, *Enterococcus*, Tropical Island, water quality

1. Introduction

Nations around the world use enterococci and *Escherichia coli* as indicators of fecal contamination of water supplies (American Public Health Association, 2005). The United States Environmental Protection Agency (US EPA) recommends testing for *E. coli* and enterococci rather than total and fecal coliform indicators, because of the direct correlation of these organisms with swimming-associated gastrointestinal illnesses (US EPA, 2003). Water quality criteria for enterococci exist for both fresh water and marine water but only for fresh water with *E. coli* since it does not generally survive in marine conditions. The water quality criterion for enterococci is a geometric mean density of 33 Most Probable Number of bacteria present (MPN)/100 ml in fresh water and 35 MPN/100 ml in marine water (US EPA, 1986).

However, uncertainty exists about which indicator is suitable for regulating recreational water bodies within the tropics, in particular for water bodies that lack a known sewage source of contamination (Shibata et al., 2004). On the overpopulated island of O‘ahu, soil samples obtained near and 10 m from a stream bank (Mānoa Stream) and from a grassy area on the University of Hawai‘i at Mānoa campus in Honolulu were determined to be sources of free living enterococci (Hardina and Fujioka,

1991). On the equatorial Pacific overpopulated tropical island of Guam, surface soil samples collected along Pago River showed average enterococci values of 710 MPN/100 g of soil (Fujioka et al., 1999). Researchers concluded enterococci exists naturally as a non-fecal source in soils of Guam, and that fecal indicator bacteria did not necessarily indicate fecal contamination of Guam's fresh and marine waters (Fujioka et al., 1999). Furthermore, water samples collected from Waimea River and coastal zone on northern O'ahu showed a range of enterococci of 8-308 bacterial colony forming units (CFU)/100 ml (Fujioka, 2001).

According to Fujioka (2001), based on data collected in lower elevation O'ahu urban, agricultural, and forested watersheds, free-living non fecal sources of enterococci exist in soils of Hawaiian riparian and coastal zones. Fujioka (2001) concluded that enterococci must not be a valid indicator of Hawaiian island ambient waters due to the high levels that often exceed US EPA recommended limits in fresh and marine waters on O'ahu after heavy rains and flooding. Alien feral animals inhabit most areas of O'ahu from summits to sea at varying densities, normally at higher densities in lower elevations.

A different study in Uganda concluded that rapid techniques for presumptive *E. coli* determination may be reliable for fecal pollution monitoring in high-altitude tropical developing countries (Byamukama et al., 2005). Furthermore, a study in Puerto Rico, an overpopulated tropical Caribbean island, concluded *E. coli* survives for extended periods in soils, and therefore might not indicate contamination from animals and humans (Carillo et al., 1985).

So, we conducted this study in order to better understand the geographic distribution of enterococci in a relatively rural tropical island forested watershed. Ideally, future research will assess background levels of enterococci in native upper elevation undisturbed forests of tropical island riparian soils and waters. We hypothesized that riparian soil and water on a rural tropical island of Kaua'i, Hawai'i did not contain free-living sources of enterococci, but that feces from animals were potential sources of enterococci for a small perennial stream in the watershed.

2. Objectives

To test this hypothesis, we located water quality monitoring sites at the start and end of stream sections chosen to represent different portions of the watershed, including sections in which wildlife were the only likely sources of microorganisms and those with other potential sources such as cattle grazing. We sampled stream water and riparian soils to better understand the spatial and temporal variation of enterococci throughout the watershed. We also examined composite soil samples for enterococci collected from 24 randomly located plots along the entire stream from MSL to 220 m elevation. By collecting information about occurrence of enterococci in fecal, soil, and water sources of enterococci, this study evaluated the proposal that tropical island riparian soils and water are sources of free-living enterococci.

3. Experimental/Materials and methods

3.1 Study Site Description

The experimental site lies in Waipā, a sub-watershed of the larger Hanalei watershed on the North side of the Hawaiian island of Kaua'i (Figure 1). Waipā watershed encompasses about 650 hectares rising from Hanalei Bay at Mean Sea Level (MSL) via a heavily forested stream and waterfalls about 4 km long to 1141 m above MSL (Figure 2 and Figure 3). Most of Waipā's uninhabited landscape vegetated with

ferns, grasses, shrubs, and trees increases in gradient along the stream course with increasing elevation. Slopes in the upper watershed approach 90° on the flanks of Mamalahoa.

The lower floodplain includes several residences, a small community center, beach campgrounds, a cattle pasture, and several very small sectored taro and organic vegetable farms. Varying weather dependent frequencies of flow of surface runoff in the watershed travel via Chinese irrigation ditches and traditional Hawaiian rock walls dug centuries ago, taro irrigation ditches, cattle pasture ditches, and compacted surfaces disturbed by people and/or grazing animals.

The community introduced free-grazing rodeo cattle into Waipā watershed approximately 30 years ago, and now about 50 cattle graze a confined lower floodplain pasture, which alters water quality in Waipā Stream and coastal zone. Unfortunately, the introduction of grazing livestock had severe negative impacts on land and water resources (Derrickson et al., 2002). Livestock damage to native forests and to watersheds through overgrazing and erosion of steep slopes was recognized as a severe problem throughout the 19th century (Cox, 1992).

Feral pigs, horses, dogs, birds, cats, and rats range in varying densities within the watershed. *Hibiscus tiliaceus* Linnaeus winding aerial and terrestrial roots dominate canopy cover of lower Waipā Stream while providing shade but no direct food source for feral animals (Ragosta et al., June 2008 submitted to Pacific Science). Strawberry guava (*Psidium cattleianum* Sabine), which dominates the vegetative canopy in mid and upper Waipā Stream, effectively prohibits growth of native grasses, trees, ferns, sedges, and shrubs. Seasonal availability of fruits such as *P. cattleianum* alters local densities and migration of hungry alien animals within Waipā watershed, and consequently the deposition of fecal matter in and near drainage ecosystems.

3.1.1 Riparian, tributary, and cattle pasture diversion ditch surface soil site description

Preliminary composite surface soil samples (0-5 cm) were collected by the author in sampling plots along the cattle pasture diversion ditch, and Waipā Stream. The samples were tested by the University of Hawai‘i Agricultural Diagnostic Services Center for background levels of pH, % OC, and nutrients to provide insight into the soil structure and integrity of the study site prior to sampling surface soil for enterococci. Using Kruskal-Wallis (Helsel and Hirsch, 2002), we found that average surface soil pH was significantly lower ($p < .05$) along the cattle pasture diversion ditch versus lower Waipā Stream. Average surface soil % OC was significantly lower ($p < .05$) along the cattle pasture diversion ditch versus lower and upper Waipā Stream. Average P, K, Ca, and Mg ($\mu\text{g/g}$) of surface soil did not significantly differ ($p > .05$) along Waipā Stream or cattle pasture diversion ditch.

3.2 Field monitoring methods

To assess relative sources and distribution of enterococci, we divided the watershed into discrete sections and monitored plots along Waipā Stream (10 x 10 m plots along lower Waipā, mid Waipā, and upper Waipā), Kapalikea and Kolopua tributaries (5 x 5 m plots), and along a cattle ditch (10 x 10 m plots) (Table 1, Figure 2). We randomly located 4 plots within each section (Figure 2) and randomly sampled surface soil (0-5 cm) from 4 locations per plot from June through August 2005. We collected 3 replicate water samples at 7 water quality monitoring sites located at the beginning and end of each stratified stream section, at the end of the cattle pasture

diversion ditch, and at the confluence of two tributaries above Waipā Stream (Figure 3) on 6 separate days in 2004-2005 to test for enterococci.

3.3 Soil sampling, processing and analysis techniques

Soil sample collection: Soil samples were collected with a sterile spatula from 0-10 cm deep, placed in four individual Whirlpak bags, sealed, transported on ice, and analyzed within 8 hours of collection for enterococci.

Soil sample processing: Soil processing steps followed the protocol of Shibata et al. (2004) with slight modifications (see below). Approximately 3 g of soil from each of four Whirlpak bags for each plot were mixed as a 12 g composite using a sterile spatula. 3 g subsamples of each soil composite were mixed with 100 ml of sterile dispersant solution (0.15 M NaCl) in sterile containers. The samples were shaken vigorously for 90 to 120 s to disperse microbes into the liquid phase. We allowed the soil solution to settle for about 5 minutes.

The modification to the Shibata et al. (2004) method included extracting 10 ml from the upper 50-70 percent of the eluate of the soil solution and mixing it with 90 ml of sterile water (< 1 *Enterococcus* MPN/100 ml) to decrease clogging of the 30 μm pore size nylon mesh filters (Type NY30, Millipore, Bedford, MA). The enterococci in soil solution was dispersed via the filter while the filter prohibited soil particles from entering the liquid extract. 100 ml of the liquid extract from the filtrate was used for subsequent bacterial enumeration. With dilution factors taken into account, the limit of detection was < 3.3 MPN/g of soil. For data analysis, values of < 3.3 MPN/g soil were reported as zero. Water content measurements were performed by measuring the weight of separate composite soil samples before and after oven drying (110°C for 24 h) approximately 12 g of sample.

3.4 Water sample collection and analysis:

Sample collection: Sampling teams walked to 7 monitoring sites in Waipā watershed on July 9th, and July 23rd, 2004, and February 9th, March 9th, March 23rd and June 1st, 2005 to assess expected variation in sampling results between dry (June and July) and wet (February and March) seasons. Each person collected 3 replicate 100 ml water samples from each monitoring site following protocol of the American Public Health Association, p. 9-21, 2005. Samples collected and analyzed for enterococci (USEPA, 2003) during the rainy season were diluted 10 to 1 with sterile water on February 9, 2005, March 9, 2005, and March 23, 2005 to avoid exceeding the upper detection limit for the analytic procedure. Samples collected during the dry season (July 9, 2004, July 23, 2004, and June 1, 2005) required no dilutions.

3 replicate samples were collected from sites 1 and 2 during two extreme rain events on February 4, 2005 at 2:30 p.m. and March 26, 2005 at 8:30 a.m., and analyzed for enterococci using 10 ml of water sample mixed with 90 ml sterile water (USEPA, 2003).

Sample processing and analysis: Enterolert media added to each water sample was shaken until the Enterolert dissolved into solution. Samples were then poured into IDEXX Quanti-Tray 2000, sealed in the IDEXX sealer, placed in an incubator at 41°C \pm .5°C for 24 hours, and read under a UV lamp.

3.5 Manure analysis

3 g of fresh cattle manure from the lower floodplain cattle pasture served as a positive control for the Shibata et al. (2004) soil enterococci test on the same day as soil sampling. The author followed cattle in the pasture and collected their fresh manure using

sterile methods directly after soil samples were collected from upper elevation control plots.

3.6 Other water quality parameters

At the same 7 water quality monitoring sites selected for enterococci analysis, we obtained field measurements of turbidity (using an OakTon Turbidimeter T-100, recording in NTU), salinity (ppt), dissolved oxygen (mg/L), electrical (dS/m) and specific conductivity (dS/m) (using a YSI MPS Multiprobe sensor 556 model). Stream discharge was measured at 3 monitoring sites along Waipā stream over four different days from 2004 through 2005 using a Marsh-McBirney Flo-Mate Model 2000 flow meter. Rainfall was recorded using tipping bucket rain gages at weather stations installed in the upper and lower parts of Waipā watershed.

3.7 Quality Assurance/Quality Control

Composite soil samples collected and tested from 8 plots in Kapalikea and Kolopua tributaries, and the two highest elevation plots along Waipā Stream served as uninhabited controls infrequently visited by people or cattle in areas with minimum disturbance. To further verify our soil enterococci test methods, we mixed 1.5 g of manure with 1.5 g of composite unprocessed soil, and ran the 50-50 tests using the same method as that for soil tests for enterococci.

3.8 Statistical Analysis of Results

The Kruskal-Wallis test was used to determine the following:
whether surface soil and enterococci water sample values significantly differed within and between sections studied,
the general equivalence of enterococci values at water quality monitoring sites and surface soil at plots.
No assumptions are required about the shape(s) of the distributions. They may be normal, lognormal, or anything else (Helsel and Hirsch, 2002).

4. Results

4.1 Positive controls with cattle manure

Control tests using 100 % cattle manure and 1:1 by weight soil-cattle manure mixture showed increases in MPN/g of enterococci with increasing amounts of manure added to the soil (Table 2 and Table 3). All cattle manure samples contained enterococci (range 179 to > 80,653 MPN/g (Table 2)), which corresponds with the range of results reported from New Zealand cattle manure (10^1 - 10^6 cfu/g, Anderson et al., 1997).

4.2 Soil analyses

The enterococci MPN/g of composite soil per plot collected and tested conforms to a highly left skewed distribution. Seventy-five percent of composite soil samples tested in each section fell below the detectable limit for enterococci (< 3.3 MPN/g) (Table 4). No significant differences ($p = 1.0$) exist between sections for average enterococci surface soil values.

4.3 Water sample enterococci results

The Kruskal Wallis test showed that the smallest absolute z value was -2.80 at site 5. The largest z value was 2.80 at site 1, indicating the most significant difference at a p value of .021 between water values at site 1 versus site 5.

A very high geometric mean ($n=3$) (1657 MPN/100 ml) occurred for site 1 on February 4, 2005 and ($n=3$) (1115 MPN/100 ml) on March 26, 2005. Over 20 cm of rain

fell in one day leading up to February 4, 2005. About 7.5 cm of rain fell in the upper watershed between March 25 and March 26, 2005.

4.4 Other water quality data

Average electrical conductivity (dS/m), specific conductivity (dS/m), and salinity (ppt) were higher at site 1 versus all other sites (Table 6). Average turbidity (NTU) was higher at site 2 versus all other sites (Table 6). Average dissolved oxygen (mg/L) is lower at site 2 versus all upstream sites. Streamflow reached a maximum of 0.24 m³/s at site 4 on July 11, 2004, and a minimum of 0.02 m³/s at site 5 on July 17, 2004 (Table 7). Average water content of the composite surface soil samples was highest in the Kapalikea tributary section (49.4%), and lowest in the mid-Waipā section (27.6 %).

5. Discussion

Researchers suggest that soil is a major environmental source of *E. coli* and enterococci in tropical islands based on soil and water quality data collected in lower elevation watersheds on O'ahu (Hardina and Fujioka, 1991), Guam (Fujioka et. al, 1999), and Puerto Rico (Carillo et. al, 1985). Some researchers suggest that elevated counts of these bacteria in Hawaiian stream mouths and coastal zones routinely exceed US EPA standards due to run-off from soil, giving false positive results with respect to implied contamination by feces of warm-blooded animals and safety of water supplies (Byappanahalli and Fujioka, 2004).

Identifiable sources of fecal contamination such as the cattle pasture diversion ditch contributed significant surface runoff through a culvert pipe into Waipā stream, representing a likely source of surface runoff contamination, especially given the very high enterococci values for cattle manure samples. Feral pigs clustering near *P. cattleianum* in the upper reaches of Kapalikea, as observed during July 2004, and/or previously grazed cattle land along Kapalikea tributary may have contributed sources of enterococci through the Kapalikea tributary over time.

Three out of four subsamples of soil per section below the detection limit may indicate a negative binomial distribution of the enterococci due to the repetitive absence of enterococci from composite surface soil samples across all sections studied. Wildlife fecal deposition in upper elevations suggest that a combination of stream channel transport, and human and animal fecal point and non-point sources in lower elevations contribute to the significant differences between enterococci water quality at site 1 (MSL) versus site 5 (220 m above MSL).

The 100 percent manure, and 50/50 manure/composite soil control data showed that soil dilutes the fecal concentrations of enterococci, and that densities of enterococci populations vary with fecal samples. Perhaps surface runoff carrying manure-soil particles might contribute to the low dissolved oxygen levels at site 2 along the cattle pasture.

Waipā Stream often clogs behind a beach sand berm, and can remain rather stagnant at the stream mouth near site 2 and site 1 except during large ocean swells and heavy rains that break open the sand berm. Perhaps similar circumstances caused *Enterococcus* concentrations during spring tides to be significantly higher than those during neap tides at 50 Southern California beaches (Boehm and Weisberg, 2005). Waipā surface runoff flows into the Pacific Ocean via outgoing tides, heavy rains, and sometimes locals dig channels thru the sand to allow Waipā Stream to flow into the sea. Also, when the tides and waves reach strong enough levels to break the berm and pull Waipā Stream to the

sea, polluted estuarine water may degrade surrounding coral ecosystems. But the lack of a scientific and methodical epidemiological investigation raises many concerns into how different user group illness rates correlates to poor fresh and marine water quality in tropical island watersheds during flashflooding and/or heavy rains.

6. Conclusions

We demonstrated that all control samples of 100 % manure, and mixed 50-50 manure and soil were positive for MPN/g of enterococci, with some containing very large numbers of MPN/g enterococci, at a minimum at least 4 times more than the highest values for MPN/g of enterococci for surface soil samples. Upper elevations of the watershed (Kapalikea, Kolopua, and mid and upper Waipā) contained surface soil values of MPN/g of enterococci below the detectable limit 75 % of the time, and when present, at low levels relative to our control samples. Therefore, although enterococci may be free living in soils and/or introduced into the soil from animals and people, fecal contamination leads to very large numbers that are significantly different from any background level of soil.

Given the environmental conditions in Waipā watershed (warm, shaded, moist soils, with ample vegetation and decomposing vegetative material on the soil surface), bacterial survival could be prolonged such that fecal contamination from feral animals could exist in the soil matrix without being visible. Fruiting of *P. cattleianum* attracts feral animals to riparian zones, leading to fecal contamination and high geometric mean values of enterococci in Waipā's coastal zone via surface runoff by natural and artificial drainage ecosystems, and compacted soil areas.

It is common for a significant amount of runoff to be generated from pastures during flood irrigation (Tate et al., 2005). Excessive irrigation diversion can reduce in-stream flow levels, which in turn can result in the reduction of available aquatic habitat, elevated stream temperatures and increased pollutant concentrations (Tate et al., 2005).

Consequently, land use changes and associated river discharges in coastal tropical regions present a global threat to coral reef environments (West et al., 2001).

Data from this study suggest that predominant enterococci sources do not come from Waipā riparian soils. This study showed significant differences in enterococci surface water values over anthropogenic disturbance and elevation gradients along a rural tropical island stream. Continued research on movement, reproduction, and survival of indicator organisms such as enterococci through tropical island watersheds could improve knowledge and application of management strategies such as buffer zones for decreasing microbial contaminants to ambient waters. Buffer zones are intended to intercept and remove waterborne contaminants before they reach a specified down-slope site (Atwill et al., 2002), and to intercept polluted surface runoff and groundwater flow to reduce pesticide, nutrient and other organic pollutants before they enter the stream (Lin et al., 2002).

Given concerns of enterococci to falsely indicate fecal contamination because the organism may survive and reproduce in soils, it would help to determine their longevity, particularly in the conditions found on rural tropical islands. It is possible that previous contamination, followed by degradation and disappearance of the fecal matrix, may leave enterococci in soils on overpopulated tropical islands such as O'ahu, Guam, and Puerto Rico, even though feces do not appear to be present.

The evidence of indigenous non-fecal sources of enterococci in tropical island native undisturbed riparian forest soils and water remains to be seen. Yet, there are a number of zoonotic (diseases transferred from animals to humans) diseases of concern to humans if ambient waters are contaminated with fecal material from non-human animal species (USEPA, 2003). Of more concern, a lack of water for washing and bathing contributes to diseases that affect the eye and skin, including infectious conjunctivitis and trachoma, as well as to diarrheal illnesses, which are a major cause of infant mortality and morbidity in developing countries (Gerba, 1996). The lack of a scientific and methodical epidemiological study correlating pathogenic ambient water quality with illness rates in all the Hawaiian and tropical islands still raises questions about which pathogenic water quality indicator, including but not limited to enterococci, works best in tropical islands.

7. Acknowledgements

University of Hawai'i at Mānoa Department of Natural Resources and Environmental Management, University of California at Davis, University of Nevada at Reno, U.S. Environmental Protection Agency Region IX, Hanalei Watershed Hui, and the Waipā Foundation for opening their land and Hawaiian traditions to researchers thereby allowing this positive exchange to happen. All research was funded via grant money from the U.S. Department of Agriculture.

8. References

- American Public Health Association, 2005. Standard Methods for the Examination of Water and Wastewater, 21st ed.,. Washington D.C.
- Anderson, S.A., Turner, S.J., Lewis, G.D., 1997. Enterococci in the New Zealand environment: implications for water quality monitoring. *Water Science and Technology*, 35 (11-12), 325–331.
- Atwill, E.R., Hou, L., Karle, B.M., Harter, T., Tate, K.W., Dahlgren, R.A., 2002. Transport of *Cryptosporidium parvum* Oocysts through Vegetated Buffer Strips and Estimated Filtration Efficiency. *Applied and Environmental Microbiology*, 68, 5517-5527.
- Boehm, A.B., Weisberg, S.B., 2005. Tidal Forcing of Enterococci at Marine Recreational Beaches at Fortnightly and Semidiurnal Frequencies. *Environmental Science Technology*, 39, 5575-5583.
- Byamukama, D., Mach, R.L., Kansiime, F., Manafi, M., Farnleitner, A.H., 2005. Discrimination Efficacy of Fecal Pollution Detection in Different Aquatic Habitats of a High-Altitude Tropical Country, Using Presumptive Coliforms, *Escherichia coli*, and *Clostridium perfringens* Spores. *Applied Environmental Microbiology*, 71 (1), 65-71.
- Byappanahalli, M., Fujioka, R., 2004. Indigenous soil bacteria and low moisture may limit but allow faecal bacteria to multiply and become a minor population in tropical soils. *Water Science and Technology*, 50 (1), 27-32.
- Carillo, M., Estrada, E, Hazen, T.C., 1985. Survival and enumeration of the fecal

indicators *Bifidobacterium adolescentis* and *Escherichia coli* in a tropical rain forest watershed. *Applied Environmental Microbiology*, 50 (2), 468–476.

- Cox, T.R. 1992. The Birth of Hawaiian Forestry: The Web of Influences. *Pacific Hist. Rev.*, 61(2), 169-192.
- Derrickson, S.A.K., Robotham, M.P., Olive, S.P., Evensen, C.I., 2002. Watershed Management and Policy in Hawai'i: Coming Full Circle. *Journal of the American Water Resources Association*, 38(2), 563-576.
- Fujioka, R., Sian-Denton, M., Borja, M., Castro, J., Morphew, K., 1999. Soil: the environmental source of *Escherichia coli* and Enterococci in Guam's streams. *The Journal of Applied Microbiology Symposium Supplement*, 85, 83S-89S.
- Fujioka, R., 2001. Monitoring coastal marine waters for spore-forming bacteria of faecal and soil origin to determine point from non-point source pollution. *Water Science and Technology*, 44, 181-188.
- Gerba, C.P. 1996. Pathogens in the Environment. *Pollution Science: Chapter 19*, pp. 279-299.
- Hardina, C.M., Fujioka, R.S., 1991. Soil: the Environmental Source of *Escherichia coli* and Enterococci in Hawai'i's Streams. *Environmental Toxicology and Water Quality: An International Journal*, 6, 185-195.
- Helsel, D.R., Hirsch, R.M., 2002. Techniques of Water-Resources Investigations of the United States Geological Survey, Book 4, Hydrologic Analysis and Interpretation, Chapter A3 Statistical Methods. Publication available at: <http://water.usgs.gov/pubs/twri/twri4a3/>
- Lin, C.Y., Chou, W.C., Lin, W.T., 2002. Modeling the width and placement of riparian vegetated buffer strips: a case study on the Chi-Jia-Wang Stream, Taiwan. *Journal of Environmental Management*, 66, 269-280.
- Ragosta, G., Ticktin, T., Evensen, C., 2008. Characterizing vegetation of a tropical island stream and tributaries on the Hawaiian island of Kaua'i. Submitted to *Pacific Science* June 2008.
- Shibata, T., Solo-Gabriele, H., Fleming, L., Elmir S., 2004. Monitoring marine recreational water quality using multiple microbial indicators. *Water Research*, 38, 3119-3131.
- Tate, K., Lancaster, D., Morrison, J., Lile D., Sado, Y., Huang, B. 2005. Monitoring helps reduce water-quality impacts in flood-irrigated pasture. *California Agriculture*, 59 (3), 168-175.

- U.S. Environmental Protection Agency, Ambient Water Quality Criteria for Bacteria, 1986. EPA440/5-84-002. Office of Water, Regulations and Standards, Criteria and Standards Division, Washington, DC, 20460.
- U.S. Environmental Protection Agency, Guidelines Establishing Test Procedures for the Analysis of Pollutants, 2003. Analytical Methods for Biological Pollutants in Ambient Water; Final Rule. U.S. Federal Register- 40 CFR Part 136 Vol. 68, No. 139.
- West K., Van Woesik, R., 2001. Spatial and Temporal Variance of River Discharge on Okinawa (Japan): Inferring the Temporal Impact on Adjacent Coral Reefs. *Marine Pollution Bulletin*, 42(10), 864-872.

Table legends:

Table 1: Sites used for synoptic water sampling on Waipā Stream

Table 2: Enterococci MPN/g cattle manure control tests for microbial soil lab techniques

Table 3: Enterococci MPN/g 50-50 soil-cattle manure control tests for microbial soil lab techniques

Table 4: Geometric mean (n=3 for each site on each date) of water samples tested for Enterococci (MPN/100 ml)

Table 5: Enterococci MPN/g composite soil per plot

Table 6: Table of means for water quality variables (n=6 total for each site. n=2 from July 2004, n=1 from February 2005, n=2 from March 2005, and n=1 from April 2005)

Table 7: Streamflow (m³/s) at 3 monitoring sites along Waipā Stream

Figure legends:

Figure 1: The study site, Waipā watershed on Kaua‘i of the Hawaiian island archipelago

Figure 2: Surface soil sampling plots of the watershed (■)

Figure 3: Water quality monitoring sites of the watershed (●)

Table 1

Monitoring Site	Description
1	Waipā Stream outlet at mean sea level (MSL)
2	End of cattle pasture diversion ditch at 3 m above MSL
3	Waipā Stream at 12 m above MSL
4	Waipā Stream at 85 m above MSL
5	Waipā Stream at 220 m above MSL
6	Confluence of Kapalikea tributary at 49 m above MSL, directly above Waipā Stream
7	Confluence of Kolopua tributary at 110 m above MSL, directly above Waipā stream

Table 2

Date of Collection	MPN enterococci/g of 100% cattle manure (2 separate 3 g samples tested)
August 1, 2005	730, 179
August 3, 2005	310, 291
August 4, 2005	8078, 3617
August 6, 2005	6812, 6083
August 16, 2005	> 80654, > 80654

Table 3

Section	MPN enterococci/g of 50-50 soil-cattle manure
Upper Waipā (2 plots)	1515.7, > 80654
Kapalikea (4 plots)	398.9, 276.7, 11.1, 236.7
Kolopua (4 plots)	436.7, 448.9, 4835.6, 1036.7

Table 4

Section (4 plots/section)	MPN enterococci/g soil per plot
Cattle Diversion Ditch	< 3.3, 22.2, < 3.3, < 3.3
Lower Waipā stream	< 3.3, < 3.3, 11.1, < 3.3
Mid Waipā stream	< 3.3, 11.1, < 3.3, < 3.3
Upper Waipā stream	< 3.3, < 3.3, < 3.3, 57.8
Kapalikea Tributary	< 3.3, < 3.3, < 3.3, 45.6
Kolopua Tributary	< 3.3, < 3.3, < 3.3, 22.2

Table 5

Date	Site 5	Site 7	Site 4	Site 6	Site 3	Site 2	Site 1
July 9, 2004	13.8	47.2	76.2	765	216	463	825.9
July 23, 2004	13	121	228	438	151	171	527.5
February 9, 2005	30.7	106	67	80.3	34	91.7	193
March 9, 2005	105	52.3	135	63	164	80.3	593.7
March 23, 2005	9.3	20.3	13.3	23.7	85.7	51.7	45.3
June 1, 2005	1.7	15.1	20	1.7	40.8	31.8	624
Single Sample Maximum	121	178	276	1300	387	687	1203
Single Sample Minimum	< 1	7.5	< 1	< 1	20	10	10



Upper Elevation.....Lower Elevation

Table 6

Monitoring Site	DO (mg/L)	EC (dS/m)	SC (dS/m)	Turbidity (ntu)	Salinity (ppt)
1	5.6	2719	2583	3.1	1.4
2	3.83	183	175	7.5	0.1
3	8.23	94	89	2.4	0.07
4	9.08	86	81	1.7	0
5	8.92	70	65	1.6	0
6	8.62	104	98	2.5	0.1
7	8.68	117	111	3.4	0.1

Table 7

Monitoring Site	July 11, 2004	July 17, 2004	March 15, 2005	May 3, 2005
3	0.09	0.11	0.1	0.14
4	0.24	0.14	0.22	0.15
5	0.03	0.02	0.07	0.06

Figure 1

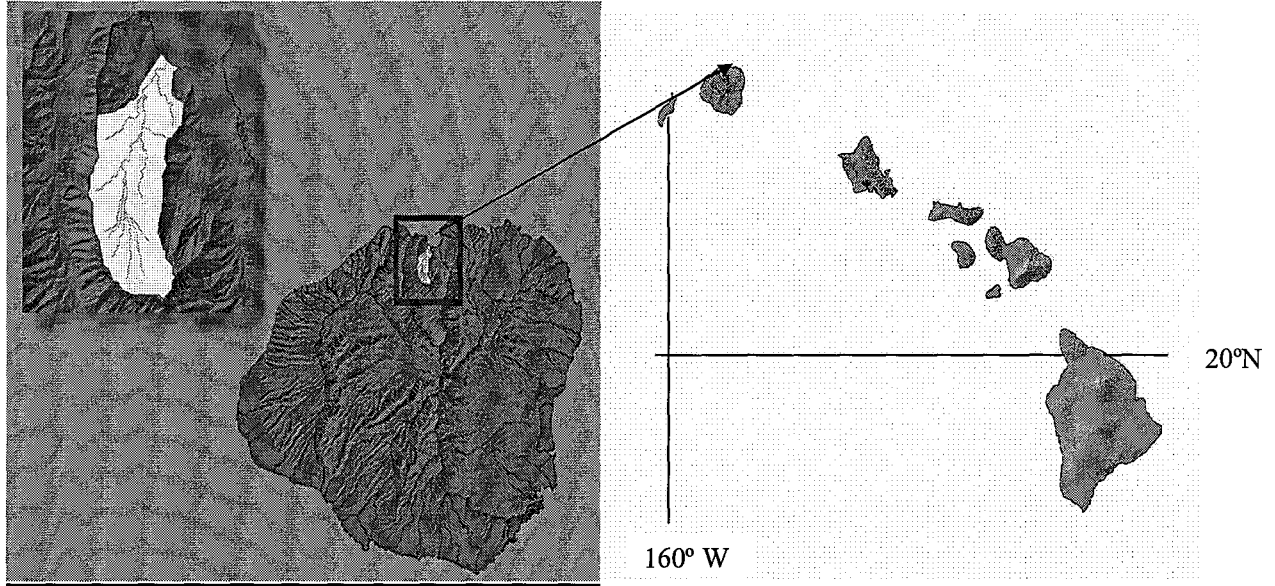


Figure 2

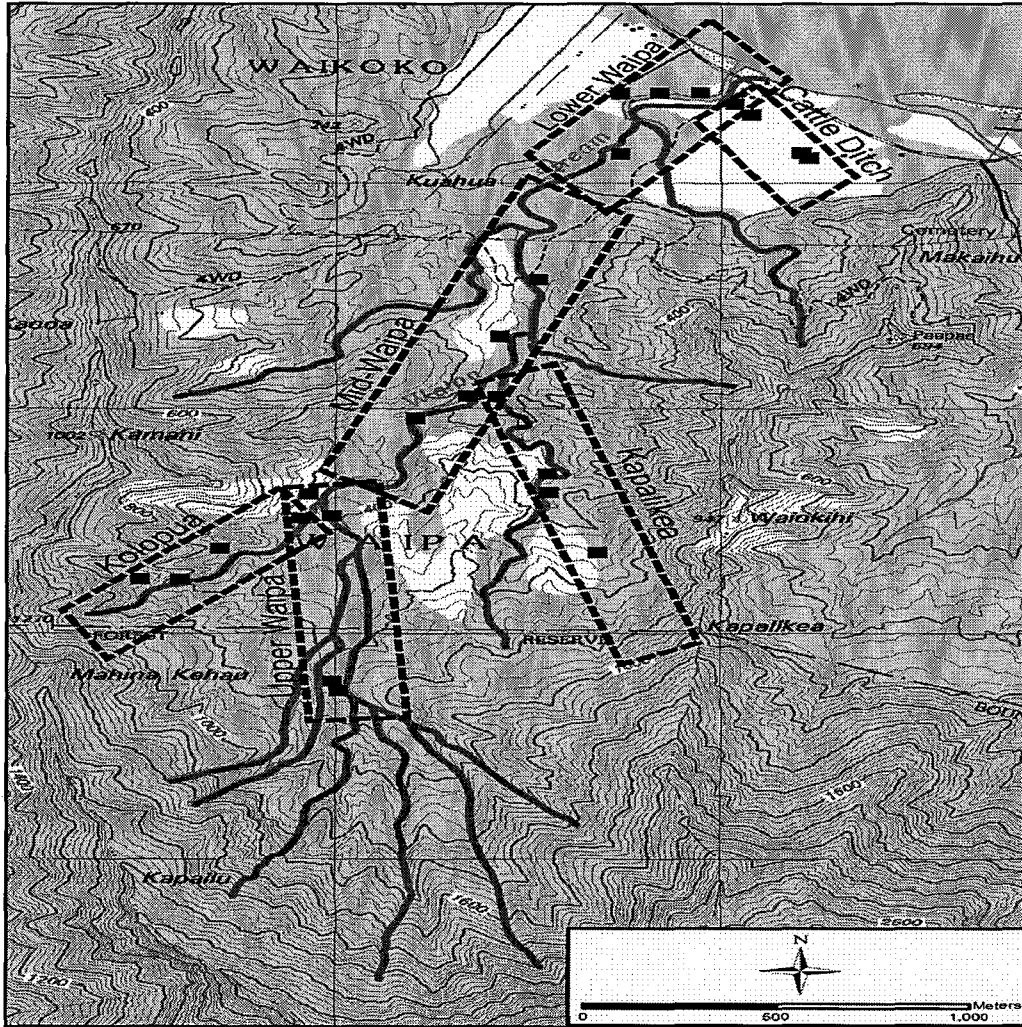
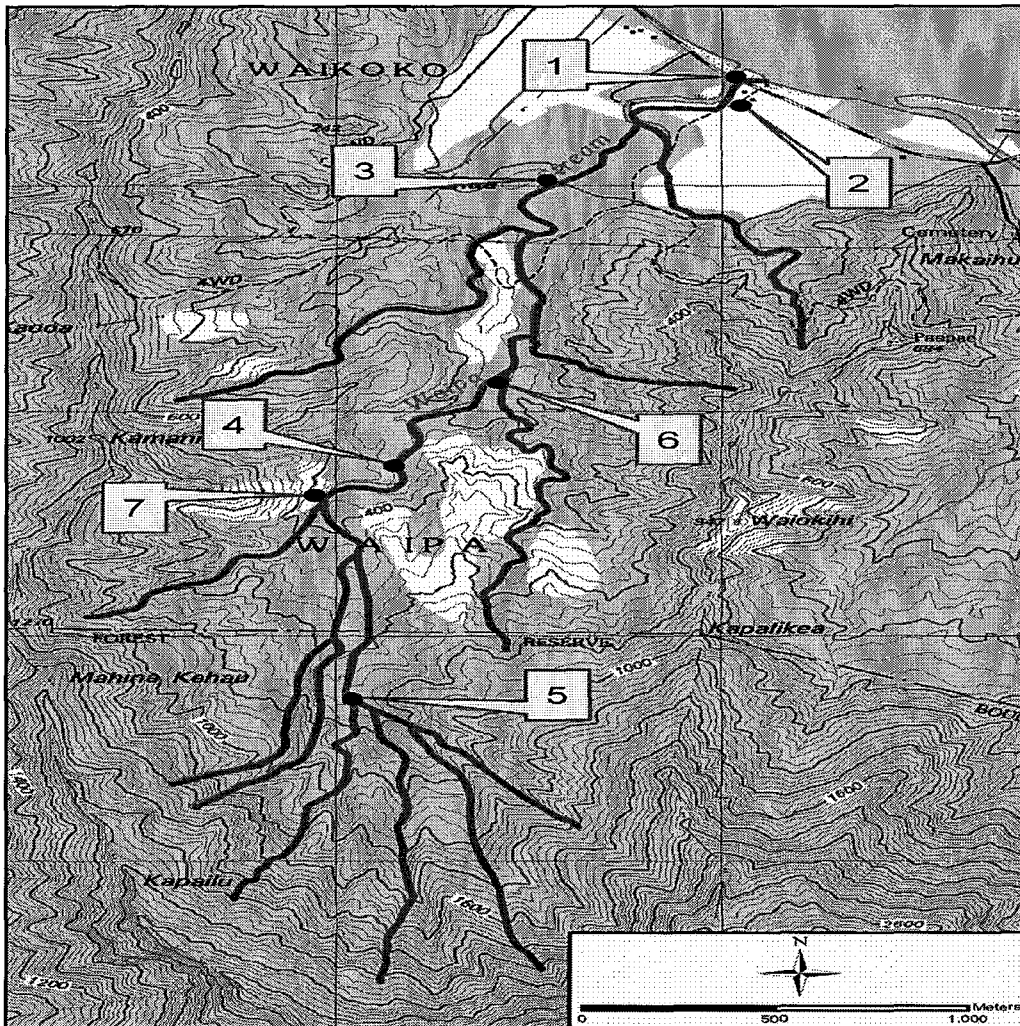


Figure 3



From: den@aloha.net
Sent: Sunday, February 22, 2009 10:03 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards. Our stream and marine waters are under threat from a variety of sources.

Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing.

Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i.

I live on the island of Lana'i, Hawaii. The only truly safe beach for swimming is at Hulopoe Bay. One of the most beautiful beaches in the world. But I cannot swim there.

Pesticide and fertilizer runoff into the Bay make my feet swell so that I cannot put my fins on. My fingers swell so that they look like sausages.

I have Multiple Chemical Sensitivity. My doctor would rather that I swim in the ocean than in a chlorinated pool. But I can't swim in the ocean at Hulopoe anymore.

We should be setting standards to increase Hawai'i's water quality standards NOT reduce them.

Sincerely,

Denise Hennig
P.O. Box 630098
Lanai City, HI 96763

808-563-1565

From: Laurie & Bob Kerr [lauriebob@gmail.com]
Sent: Friday, February 20, 2009 5:41 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

To Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are already under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would at least double or triple the amount of pesticides and bacteria allowed in the water.

We depend on our water for everything from food to recreation to tourism. I can just imagine the news that Hawaii is reducing water quality standards and how this would be viewed by our visitors. How could we possibly jeopardize this valuable resource so that people who want to use pesticides can pollute Hawaii.

Mahalo,

*Laurie and Bob Kerr
2619 S. Kihei Rd
Kihei, HI 96753*

From: AlohaJade@aol.com
Sent: Friday, February 20, 2009 8:06 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

*Mahalo,
Jade English
PO Box 954
Kihei, HI 96753*

A Good Credit Score is 700 or Above. See yours in just 2 easy steps!

From: Bob Babson [babsonb001@hawaii.rr.com]
Sent: Friday, February 20, 2009 9:22 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

Sincerely,

Bob Babson
3371 Kaha Drive
Kihei, HI 96753

From: Charles Baird [lost379sheep@yahoo.com]
Sent: Friday, February 20, 2009 9:43 PM
To: HTHTestimony
Cc: lost379sheep@yahoo.com
Subject: Testimony%20in%20Opposition%20to%20SB%201008,%20February%2023,%202009%
20at%202:45%20P.M.

Howzit:

Please don't vote for lowering our water quality standards. We voted for change, progressive change not regressive, keep the voter's faith in our elected members of the legislature. It's time for a change not a time out.

Aloha,

Charles D. Baird

From: Strickland, Tammy A SGT NG NG FORSCOM [tammy.a.strickland@us.army.mil]
Sent: Saturday, February 21, 2009 3:57 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834) reducing Hawai'i's water equality standards. Our stream and marine waters are under threat from a variety of sources and should be protected from further harm. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. I have seen some areas making a comeback (on Oahu, especially) Therefore, I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without thorough scientific analysis of how this would impact Hawai'i. For all of us and our future generations, please help cherish our treasures.

Sincerely,

Tammy Strickland

From: marianne defrancia [mpdefrancia@gmail.com]
Sent: Saturday, February 21, 2009 8:21 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i.

I play in the ocean at least every weekend in Hawai'i, either surfing, paddling, fishing, and diving. I also teach my kindergarten students at Fern Elementary School about what we all can do to take care of our oceans and waterways. Please take care of our oceans. Malama I Ke Kai!!!

Sincerely,
Marianne de Francia
2507 Gardenia St. Honolulu, HI 96816

From: marv mathews [marvmathews@gmail.com]
Sent: Saturday, February 21, 2009 11:57 AM
To: HTHTestimony
Subject: SB 1008 and HB 834

We are strongly opposed to lowering water standards for Hawaii. Not only is it regressive and destructive in its own right, but it ignores the unique and fragile environment of these islands.

Marv and Barbara Mathews
44 White Sands Pl
Kailua, HI 96734

From: Amy W Jenkins [amywj@hawaii.edu]
Sent: Saturday, February 21, 2009 1:08 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. With the immense use of Hawai`i's waters for recreational use and the large amount of fish eaten from Hawai`i's waters, I therefore cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

Sincerely,

Amy Jenkins
Amnesty International USA
Student Activist Coordinator - HI
amywj@hawaii.edu
3171 Oahu Ave
Honolulu, HI 96822
(808) 652-5571

From: den@aloha.net
Sent: Sunday, February 22, 2009 11:06 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards. Our stream and marine waters are under threat from a variety of sources.

Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing.

Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i.

I live on the island of Lana'i, Hawaii. The only truly safe beach for swimming is at Hulopoe Bay, one of the most beautiful beaches in the world. But I cannot swim there.

Pesticide and fertilizer runoff into the Hulopoe Bay make my feet swell so that I cannot put my fins on. After I swim there, I my fingers swell so that they look like sausages and I cannot get my shoes on for a week.

I have Multiple Chemical Sensitivity. Three of my doctors have told me that I have to swim for various therapeutic reasons. Dr. George Ewing would rather that I swim in the ocean than in a chlorinated pool. But I can't swim in the ocean at Hulopoe anymore.

We should be setting standards to increase Hawai'i's water quality standards NOT reducing them.

Sincerely,

Denise Hennig

P.O. Box 630098 • Lanai City, HI 96763 • 808-563-1565

From: Michelle Dancer [dancer_michelle@hotmail.com]
Sent: Saturday, February 21, 2009 1:50 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008
Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

Sincerely,
Michelle Stubblefield
6322-A Gier St.
Kailua, HI 96734

Windows Live™ Hotmail@...more than just e-mail. [See how it works.](#)

From: Janelle L Williams [jlw2@hawaii.edu]
Sent: Sunday, February 22, 2009 10:48 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

As a student at the University of Hawaii at Hilo focusing on the health of Hawaii's streams and coastal fish ponds as a way to potentially help us in sustaining local populations, I cannot support a bill that will almost certainly further the devastation to nursery habitats for young fish. With algal blooms already smothering corals and reducing their photosynthetic abilities caused by unnaturally high levels of nutrients, this bill will further reduce the currently lacking protections for coastal waters. As it is cess pools and coastal water monitoring is already lacking. Please reconsider this bill, please do not support the passage of it.

Mahalo nui,

*Janelle Williams
Undergraduate Student
UHH, Environmental Studies Major
jlw2@hawaii.edu*

From: Richard Frankel [frankelr001@hawaii.rr.com]
Sent: Saturday, February 21, 2009 1:57 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chairperson Gabbard and Committee members:

*I urge you to **reject** SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our fresh water and salt water are critical to our personal health and the health of our islands. Coral reefs around the state are disappearing. Some reef fish are so full of toxins that people are advised not to eat them before testing, and testing is impractical. Therefore I oppose any proposal that would double or triple the amount of pesticides and/or bacteria allowed in the water, at least without thorough and convincing scientific evidence that this will not have a negative impact on our State and the health of our citizens.*

*Sincerely,
Richard I. Frankel, M.D., M.P.H.
931 Uwao St.
Honolulu*

From: Michael Winneguth [whizzer002001@yahoo.com]
Sent: Saturday, February 21, 2009 1:51 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i. We eat fish only twice a month because of the already high existing mercury content. Let's not make it worse.

Respectfully, Mike Winneguth, Princeville, Kauai

From: den@aloha.net
Sent: Monday, February 23, 2009 1:03 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards. Our stream and marine waters are under threat from a variety of sources.

Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing.

Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i.

I live on the island of Lana'i, Hawaii. The only truly safe beach for swimming is at Hulopoe Bay, one of the most beautiful beaches in the world. We want to keep it that way.

Pesticide and fertilizer runoff have caused a "Dead Zone" on the developed west side of Hulopoe Bay. You won't see one fish. Don't go swimming too close to the drain from the Golf Course or your body parts will swell and you won't feel too good for a few days. The fish left long ago.

Fortunately Manele Bay Hotel guests don't go swimming over that far. Not a good snorkeling spot since there aren't any fish.

It's only us locals who've been know to swim over to check out the new construction . . . thus, the rash, swelling and nausea.

We should be setting standards to increase Hawai'i's water quality standards NOT reducing them.

Sincerely,

Rosanna Richardson
808-559-0825

From: den@aloha.net
Sent: Monday, February 23, 2009 1:33 AM
To: HTHTestimony
Subject: [Fwd: Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.]

----- Original Message -----
Subject: Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

From: den@aloha.net
Date: Mon, February 23, 2009 1:31 am
To: repmoshiro@Capitol.hawaii.gov
replee@Capitol.hawaii.gov
repaquino@capitol.hawaii.gov
repawana@Capitol.hawaii.gov
repbrower@Capitol.hawaii.gov
repchoy@capitol.hawaii.gov
repcoffman@capitol.hawaii.gov
rephar@Capitol.hawaii.gov
repkeithagaran@capitol.hawaii.gov
repclee@capitol.hawaii.gov
repnishimoto@Capitol.hawaii.gov
repsagum@Capitol.hawaii.gov
reptokioka@Capitol.hawaii.gov
repwooley@capitol.hawaii.gov
repyamashita@Capitol.hawaii.gov
reppine@Capitol.hawaii.gov
repward@Capitol.hawaii.gov

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards. Our stream and marine waters are under threat from a variety of sources.

Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing.

Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i.

I live on the island of Lana'i, Hawaii. The only truly safe beach for swimming is at Hulopoe Bay, one of the most beautiful beaches in the world. We want to keep it that way.

Pesticide and fertilizer runoff have caused a "Dead Zone" on the developed west side of Hulopoe Bay. You won't see one fish. Don't go swimming too close to the drain from the Golf Course or your body parts will swell and you won't feel too good for a few days. The fish left long ago.

Fortunately Manele Bay Hotel guests don't go swimming over that far. Not a good snorkeling spot since there aren't any fish.

It's only us locals who've been know to swim over to check out the new construction . . . thus, the rash, swelling and nausea.

We want to eat the food we catch without worrying if they are contaminated.

We should be setting standards to increase Hawai'i's water quality standards NOT reducing them. Why would anyone want to use Federal water quality standards if they are not as stringent as Hawai`i's existing standards? Let's not go backwards.

Sincerely,

Cyrus Keanini, Sr. and Cyrus Keanini, Jr.

808-563-0047

From: Janelle L Williams [jlw2@hawaii.edu]
Sent: Sunday, February 22, 2009 10:48 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

As a student at the University of Hawaii at Hilo focusing on the health of Hawaii's streams and coastal fish ponds as a way to potentially help us in sustaining local populations, I cannot support a bill that will almost certainly further the devastation to nursery habitats for young fish. With algal blooms already smothering corals and reducing their photosynthetic abilities caused by unnaturally high levels of nutrients, this bill will further reduce the currently lacking protections for coastal waters. As it is cess pools and coastal water monitoring is already lacking. Please reconsider this bill, please do not support the passage of it.

Mahalo nui,

*Janelle Williams
Undergraduate Student
UHH, Environmental Studies Major
jlw2@hawaii.edu*

From: Elizabeth Dunne [emkdunne@gmail.com]
Sent: Sunday, February 22, 2009 8:53 PM
To: HTHTestimony
Subject: Testimony in Strong Opposition to SB 1008 2/23 at 2:45

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. A proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i is unacceptable. Before any change is made to the water quality standards, Hawai'i must undertake scientific review, with public input, of each beach and stream.

Mahalo for this opportunity to testify.

Elizabeth M. Dunne
Honolulu, Hawaii 96817

From: Malia Morales [malia@maoorganicfarms.org]
Sent: Saturday, February 21, 2009 11:36 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I STRONGLY oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot and will not support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

As a native Hawaiian educator whose family has fished and gathered of Hawai`i's waters for generations, I urge all committee members to be mindful of the effects of today's decisions on our youth and future generations. Please work to ensure the safety and health of our children and our environment.

Sincerely,

Malia Morales

2019 Puna St.

Honolulu, Hawai`i 96817

From: Theresa - kai [kai_wahine@hawaii.rr.com]
Sent: Sunday, February 22, 2009 4:12 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Testimony in Strong Opposition to SB 1008
Submitted by email February 22, 2009; 3:51 PM approx.
Chair Gabbard and members of the Committee:

As residents of Hawai'i Island we strongly oppose SB 1008 (and the companion House Bill 834) which seriously reduce Hawai'i's water quality standards, and appear to do so with short or inadequate notice to the public at large. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. There is no evidence that increasing toxic pollutant levels will NOT, in the mid to long term, irreparably harm our marine sanctuaries, fisheries, and environment. With increased development and the use of pesticides and fertilizers close to the ocean and watersheds it is neither prudent nor logical to relax any safeguards. Therefore we cannot support.. and strongly urge the Committee, to oppose a proposal that would double or triple the amount of pesticides and bacteria allowed in the water. In this time of rapidly disappearing eco-systems we need to pursue even more aggressive measures to protect and restore marine environments.

Respectfully Submitted
William and Theresa Maris
68-1376 S. Pauoa Road B22
Kamuela, HI 96743

From: Steve Carll [stevecar@lava.net]
Sent: Sunday, February 22, 2009 4:22 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

I have two young children, ages 4 and 7. The four-year-old, my daughter Lucy, has Crohn's Disease, an autoimmune disorder, so her health is particularly vulnerable to negative changes in her environment. Please don't allow her--or any of our--environment to become more toxic.

*Sincerely,
Steve Carll
1673 Paula Dr.
Honolulu 96816*

From: ESmith1703@aol.com
Sent: Sunday, February 22, 2009 4:57 PM
To: HTHTestimony
Cc: Rep. Marcus Oshiro; Rep. Marilyn Lee; Rep. Henry J.C. Aquino; Rep. Karen Awana; Rep. Tom Brower; Rep. Isaac W. Choy; Rep. Denny Coffman; Rep. Sharon Har; Rep. Gilbert Keith-Agaran; Rep. Chris Kalani Lee; Rep. Scott Nishimoto; Rep. Roland Sagum; Rep. James Tokioka; Rep. Jessica Wooley; Rep. Kyle Yamashita; Rep. Kymberly Pine; Rep. Gene Ward
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M (also HB 834)

Testimony in Opposition to SB 1008

Chair Gabbard and members of the Committee:
(I have never done this by email, so I trust this is acceptable)

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawaii's water quality standards. I have been a scuba diver and my partner has been a sailor for years. Hawaii's waters are great, but not perfect. Don't make them less so.

I also regularly check on the water quality of what we drink and am sorry to know that many places on Oahu do not now have a great water as we do in Kailua.

Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing.

I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawaii.

Thank you,
Elbridge W. Smith
1583 Ulupuni St
Kailua, Hawai'i 96734
261-6929

A Good Credit Score is 700 or Above. See yours in just 2 easy steps!

From: KEALIA GEDAYLOO-SUDDEN [kealiajgs@hotmail.com]
Sent: Sunday, February 22, 2009 5:56 PM
To: HTHTestimony
Subject: hawaii waters

Aloha,

To whom this may concern, I strongly oppose SB 1008 and the companion House Bill 834! Hawaii is a tourist destination!!!!!! How are the tourists going to feel when there are no coral reefs left to dive on and no fish left in the sea...help hawaiian waters! Do not let the high standards of clean water slip now!
mahalo for you time,
Kealia Sudden

Windows Live™ Hotmail@:...more than just e-mail. [Check it out.](#)

From: KATHLEEN JOHNSON [savantb2@yahoo.com]
Sent: Friday, February 20, 2009 3:39 PM
To: HTHTestimony
Subject: Testimony in Strong Opposition to SB 1008

Categories: Green Category, Blue Category

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i. As often happens, our government is being shortsighted and we all pay the cost of "Paradise Lost".

Sincerely,

Kathleen Johnson

P O BOX 390864

Keauhou, HI 96739

From: T Welch [tatishab@gmail.com]
Sent: Friday, February 20, 2009 4:15 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

*Sincerely,
Tatiana Welch
233 Akiohala St.
Kailua, HI 96734*

From: aabaer@aol.com
Sent: Friday, February 20, 2009 2:01 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

Please do not reduce water quality standards.
Hawaii's fish are already filled with mercury compared to the national average.
Sincerely,
Andrea Baer

A Good Credit Score is 700 or Above. See yours in just 2 easy steps!

From: Annette Kaohelaulii [annettesadventures@juno.com]
Sent: Friday, February 20, 2009 2:06 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

Chair Gabbard and members of the Committee on Energy and Environment:

I am writing to strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai'i's water quality standards.

Many years ago, wise legislators decided that Hawaii's water quality standards could be more stringent than the federal standards. Through the years we have been able to maintain our high quality water standards throughout the state. Let's continue to keep our high standards.

Our stream and marine waters are under constant threat from a variety of sources. Coral reefs around the state are in deplorable condition. The Navy has just recently admitted that the grounding of the Port Royal did damage the reef and they reluctantly admitted that there was a waste water spill. Frankly, the military and federal government are part of the threat to our waters. We are advised not to eat reef fish before testing. How sustainable can Hawaii be when our ocean resources are a risk? We must do **more** to protect the quality of our waters. We depend on good water quality for our near shore sustenance and for our many marine recreational activities.

I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai'i. I urge you to protect our water quality, not weaken the standards.

Sincerely,
Annette Kaohelaulii
45-403 Koa Kahiko Street
Kaneohe, HI 96744

From: Barbara Dinoff [dinoff@hawaii.edu]
Sent: Friday, February 20, 2009 2:22 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

Please maintain the high water quality standards in Hawaii based on our greater, year-round use of our oceans and streams.

What works for the east coast of the mainland may not work here. People in Hawai'i eat up to three times more fish than people on the mainland. We also use our waters for recreation year-round. Why should we adopt "minimal" EPA standards that don't consider Hawai'i's unique beaches and streams?

Toxicology is a complex, highly technical area. Water standards should not be changed willy-nilly without scientific review and public input for each beach and stream in Hawai'i.

This bill arbitrarily sets coastal waters five hundred meters from shore as "infrequent use coastal recreation waters," thus even further lowering the water quality standards. Surfers, kayakers, paddlers, fishermen, snorkelers, and divers frequently go further than five hundred meters from the shoreline -- don't they deserve protection?

From: Gail Jackson [billgail.hi@gmail.com]
Sent: Friday, February 20, 2009 2:27 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Blue Category, Green Category

Chair Gabbard and members of the Committee:

Please oppose SB 1008 (and companion House Bill 834) reducing Hawai'i's water quality standards. Increasing toxic threats to coral reefs, fisheries, and families is incredibly bad policy.

Sincerely,

Gail W. Jackson & William B. Simonsma

68-1907 Lina Poepoe St.

Waikoloa, HI 96738

From: Alan Ewell [ewell@hawaii.rr.com]
Sent: Friday, February 20, 2009 1:07 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008

Categories: Green Category, Blue Category

Testimony in Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore, I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water without a thorough scientific analysis of how this would impact Hawai`i's marine resources.

Sincerely,

Alan Ewell

4176 Round Top Drive

Honolulu, HI 96822

From: Loren Sr. [lorensr11@webtv.net]
Sent: Friday, February 20, 2009 12:29 PM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

I strongly oppose SB108 (and the copanion House Bill 834), reducing Hawai's water quality standards.

Sincerely, Loren Johnson
3600 Waha Rd., Kalaheo, HI

From: Al Beeman [albeeman@yahoo.com]
Sent: Friday, February 20, 2009 11:46 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

*Testimony in Strong Opposition to SB 1008
Chair Gabbard and members of the Committee:*

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

I am actually amazed that HTHT would even consider doing such a thing!

*Respectfully,
Al Beeman
908 Kumukoa St
Hilo, HI*

From: Serena Sauvignon [serenadivina@yahoo.com]
Sent: Friday, February 20, 2009 11:47 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

Testimony in Strong Opposition to SB 1008

Chair Gabbard and members of the Committee:

I strongly oppose SB 1008 (and the companion House Bill 834), reducing Hawai`i's water quality standards. Our stream and marine waters are under threat from a variety of sources. Coral reefs around the state are disappearing. Some reef fish are so full of toxins, people are advised not to eat them before testing. Therefore I cannot support a proposal that would double or triple the amount of pesticides and bacteria allowed in the water, particularly without a thorough scientific analysis of how this would impact Hawai`i.

Sincerely,

Serena Kaldi

45-175 Kokokahi Pl.

Kaneohe, HI 96744

From: Laurel Shim [lolly@hawaii.rr.com]
Sent: Friday, February 20, 2009 11:52 AM
To: HTHTestimony
Subject: Testimony in Opposition to SB 1008, February 23, 2009 at 2:45 P.M.

Categories: Green Category, Blue Category

I oppose SB 1008.

Laurel Shim
2007A Hunnewell Street
Honolulu, Hawaii 96822
(808) 988-1114

Report Title:

Water Quality Standards

Description:

Amends state water quality standards for marine waters to conform to federal standards.

HOUSE OF REPRESENTATIVES
TWENTY-FIFTH LEGISLATURE, 2009
STATE OF HAWAII

H.B. NO. 834
H.D. 1

A BILL FOR AN ACT

RELATING TO WATER QUALITY STANDARDS.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The purpose of this Act is to revise certain state water quality standards for marine waters on an interim basis to conform to levels recommended by the State of Hawaii and United States Environmental Protection Agency, until the state Department of Health proposes, and the United States Environmental Protection Agency approves, standards for the pollutants and indicator organism identified herein, pursuant to the triennial review of state water quality standards mandated under section 303(c)(1) of the Clean Water Act. The legislature finds that these revisions are important to the economic or social development of the State, and that these revised

standards are adequate to fully protect the existing uses of the State's marine waters.

SECTION 2. In accordance with Sections 303(c) and 304(a) of the Clean Water Act and the 2006 United States Environmental Protection Agency National Recommended Water Quality Criteria, the following water quality standards are hereby adopted by the State and shall apply to all state waters:

(A) Chlordane

~~(1) Human health for consumption, water + organism:~~

~~0.00080 μ /l;~~

~~(2) Human health for consumption, organism only:~~

0.00081 μ g/l; and

(B) Dieldrin

~~(1) Human health for consumption, water + organism:~~

~~0.000052 μ /l; and~~

~~(2) Human health for consumption, organism only:~~

0.000054 μ g/l.

SECTION 3. (a) In accordance with 40 Code of Federal Regulations Section 131.41, the State designates as coastal recreation waters all waters up to three miles from shore to a depth of thirty-three meters, excluding areas where water contact recreational activities are prohibited by State or federal law or regulation.

(b) In coastal recreation waters within five hundred meters from the shoreline, enterococcus content shall not exceed a geometric mean of thirty-five colony forming units per one hundred milliliters in not less than five samples which shall be spaced to cover a period between twenty-five and thirty days. No single sample shall exceed the single sample maximum of one hundred and four colony forming units per one hundred milliliters or the site-specific one-sided seventy-five per cent confidence limit.

(c) Coastal recreation waters between five hundred meters and three miles from shore shall be designated as infrequent use coastal recreation waters, and enterococcus content in these waters shall not exceed a geometric mean of thirty-five colony forming units per one hundred milliliters in not less than five samples which shall be spaced to cover a period between twenty-five and thirty days. No single sample shall exceed the single sample maximum of five hundred and one colony forming units per one hundred milliliters or the site-specific one-sided ninety-five per cent confidence limit.

SECTION 4. To the extent the provisions of Title 11, Chapter 54, of the Hawaii Administrative Rules are inconsistent with this Act, they are superseded. Water quality standards not inconsistent with this Act shall remain in effect.

SECTION 5. If any provisions of this Act, or the application thereof to any person or circumstances, is held invalid, the invalidity does not affect other provisions or applications of this Act which can be given effect without the invalid provision or application, and to this end the provisions of this Act are severable.

SECTION 6. This Act shall take effect upon approval, except that ~~the~~ specific water quality standards prescribed herein shall take effect upon their approval by the United States Environmental Protection Agency. This Act shall be repealed upon the approval by the United States Environmental Protection Agency of water quality standards for the pollutants and indicator organisms identified herein, following the State's review of water quality standards pursuant to Section 303(c)(1) of the Clean Water Act.

INTRODUCED BY: _____

By Request

STAND. COM. REP. NO. ____
Honolulu, Hawaii
February__, 2009

RE:H.B. No. 834
H.D. 1

Honorable Calvin K.Y. Say
Speaker, House of Representatives
Twenty-Fifth State Legislature
Regular Session of 2009
State of Hawaii

Sir:

Your Committees on Energy & Environmental Protection
and Water, Land, & Ocean Resources, to which was referred
H.B. No. 834 entitled:

"A BILL FOR AN ACT RELATING TO WATER QUALITY STANDARDS"

beg leave to report as follows:

The purpose of this bill is to revise by statute the Hawaii
water quality standards for bacteria in marine recreational
waters and the water quality standards for two toxic
pollutants, chlordane and dieldrin, to conform to federal
standards consistent with the recommendations of the Hawaii
State Department of Health and the United States
Environmental Protection Agency.

This bill updates the water quality standards for chlordane
and dieldrin to conform to current EPA national recommended
criteria and for enterococcus to adopt amendments proposed
by the Department of Health in 2005, which have not yet
been formally adopted.

Your Committee received testimony in support of this
measure from the Hawaii State Department of Health, the
City and County of Honolulu, Dr. Hans Krock, emeritus
professor of Ocean and Resources Engineering, and Dr. Roger
Fujioka. Dr. James Moncur (?) and _____ of the
University of Hawaii Water Resources Research Center.

Your Committee finds that the updates to the water quality standards provided for in this bill are necessary and appropriate. The Department of Health has acknowledged that the State's water quality standards need to be updated. Indeed, the existing water quality standards for toxic pollutants are based on outdated EPA criteria from nearly 30 years ago. In addition, the Department of Health itself studied and proposed the amendments to the enterococcus standards that are reflected in this bill as noted in the Executive Summary of the Proposed Amendments to the Hawaii Administrative Rules Chapter 11-54, Water Quality Standards, dated April 11, 2005. Hawaii Chapters of the Sierra Club and the Surf Rider Foundation supported these 2005 proposed amendments.

The water quality standards for toxic pollutants are numeric values for pollutant concentrations in ambient waters considered to be protective of human health. The criteria are developed under section 304(a) of the Clean Water Act (CWA) and are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects.

The Clean Water Act ("The Act") requires that EPA periodically revise criteria for water quality to accurately reflect the latest scientific knowledge about the kind and extent of identifiable effects on health and welfare from the presence of pollutants in any body of water. In accordance with the Federal Register announcement on November 3, 2000, EPA announced the availability of final revisions to the Methodology for Deriving Ambient Water Quality Criteria (AWQC) for the Protection of Human Health (2000) ("2000 Human Health Methodology") published pursuant to section 304(a)(1) of The Act. These 2000 revisions were prompted by the many significant scientific advances that had occurred during the past 20 years in such key areas as cancer and non-cancer risk assessments, exposure assessments, and bioaccumulation assessments. Based on these scientific improvements, EPA released updated AWQC in National Recommended Water Quality Criteria: 2002 (2002 AWQC; EPA Office of Water, November 2002) which continue to be in effect. (2006 AWQC; EPA Office of Water, 2006). Federal regulations specifically allow States to adopt such numeric criteria. 40 CFR §131.11.

When developing the numeric standards for toxic pollutants in 1990, the Department of Health derived its standards from the Guidelines and Methodology published by EPA in November 1980 ("1980 Methodology) and it has not updated its toxic standards since then.

The Department of Health testified in support of adopting the current EPA national recommended criteria for toxic pollutants, with a limited exception for certain metals. In fact, your Committee received testimony from DOH that these federally recommended toxic pollutant criteria provide substantial and sufficient public health protection and are developed with nationwide resources and expertise that cannot be matched at state level. Your Committee finds that the study and analysis documented by the EPA, as reviewed and accepted by DOH, provides strong support for this measure.

In addition, the Department of Health testified in support of legislative adoption of the water quality standards for the indicator organism enterococcus that have been pending since 2005. Your Committee finds that the rationale for these amended standards, which have been publicly posted and available since 2005, remains valid and strongly supports the adoption of the proposed revised enterococcus standards.

Finally, your Committee finds that legislative action is needed, because while the Department of Health has acknowledged its obligation to review and modify the state water quality standards every three years, and that such a review is overdue, the Department has testified that it will not be able to promulgate the updated standards in the near future and that legislative action would be more expedient. Moreover, the delay in updating and correcting these existing outdated water quality standards has adverse consequences for the residents of the City and County of Honolulu, as the City continues to be held in litigation and by the EPA to standards that are no longer appropriate.

Accordingly, because water quality standards that are based on the best available science and data are of utmost importance to the State, your Committee recommends passage of this bill to amend by statute the state water quality standards for enterococcus, chlordane and dieldrin to be consistent with the most current recommendations of DOH and the EPA.

Your Committee has amended HB 834 by adding clarifying language to the purpose clause and effective date, by deleting the chlordane and dieldrin standards for water + organism, and by making other technical, nonsubstantive amendments for purposes of clarity and style.

As affirmed by the record of votes of the members of your Committees on Energy & Environmental Protection and Water, Land, & Ocean Resources that is attached to this report, your Committees are in accord with the intent and purpose of H.B. No. 834, as amended herein, and recommends that it pass Second Reading in the form attached hereto as H.B. No. 834, H.D. 1, and be referred to the Committee on Finance.

Respectfully submitted
on behalf of the members
of the Committees on
Energy & Environmental
Protection and Water,
Land, & Ocean Resources,

KEN ITO, Chair

HERMINA MORITA, Chair